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OPPORTUNITIES AND RISKS OF COLONOSCOPY IN COLONIC DIVERTICULAR DISEASE

Abstract. This article analyzes the results of screening, diagnostic, and differential diagnostic colonoscopy. The efficacy of colonoscopy (sensitivity and specificity) in the diagnosis of colonic diverticular disease was determined in relation to pathological processes occurring in the intestinal lumen, its wall, mesentery, and other organs of the abdominal cavity and pelvis. The sensitivity and specificity of colonoscopy in examining the intestinal lumen were 87 and 83 %, respectively, while in examining the intestinal wall, they were 23.03 and 81 %, respectively. With regard to the efficacy of colonoscopies in detecting pathologies of the mesentery and other abdominal and pelvic organs, the results were null. Henceforth, colonoscopy is an informative diagnostic method for pathological processes in the lumen of the large intestine without radiation exposure. During the procedure, video recording with subsequent analysis can be performed, a biopsy can be taken for differential diagnosis, and the source of bleeding can be identified if present. Having said that colonoscopies have several limitations that reduce their effectiveness in cases of complicated colonic diverticular disease. These limitations include the inability to assess the condition of the paracolic tissue, mesentery, or other abdominal and pelvic organs; difficulty in accurately localizing diverticula and inflammatory processes relative to intestinal segments; inability to evaluate the extent of parietal pathological changes; impossibility of examining proximal intestinal segments in cases of stenosis or obstruction of the lower sections; and most importantly, the risk of intestinal wall perforation.

Consequently, colonoscopies in cases of diverticular disease should be performed in strict accordance with established indications, which include obtaining biopsy material and identifying the source of the bleeding.

Keywords: diverticular disease, colon, colonoscopy, sensitivity, specificity

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ВОЗМОЖНОСТИ И РИСКИ КОЛОНОСКОПИИ ПРИ ДИВЕРТИКУЛЯРНОЙ БОЛЕЗНИ ОБОДОЧНОЙ КИШКИ

Аннотация. В статье проведен анализ результатов скринингово-диагностической и дифференциально-диагностической колоноскопии. Определена эффективность колоноскопии (чувствительность и специфичность) при дивертикулярной болезни ободочной кишки по отношению к патологическим процессам, происходящим в просвете кишки, ее стенке, брыжейке и других органах брюшной полости и малого таза. Чувствительность и специфичность колоноскопии при обследовании просвета кишки составили 87 и 83 %, а при обследовании стенки – 23,03 и 81 % соответственно. Что касается эффективности колоноскопии при патологиях брыжейки и других органов брюшной полости и малого таза, то она равна нулю. Следовательно, колоноскопия является информативным методом диагностики патологических процессов, происходящих в просвете толстой кишки, без лучевой нагрузки. В ходе процедуры можно провести видеозапись с последующим анализом, взять биопсию для дифференциальной диагностики и установить место кровотечения при его возникновении. Но при этом колоноскопия обладает рядом недостатков, ограничивающих ее возможности при осложненном течении дивертикулярной болезни ободочной кишки. К таким недостаткам относятся: невозможно оценить состояние параколической клетчатки и брыжейки или других органов брюшной полости и малого таза; не всегда можно определить место локализации дивертикулов и воспалительных процессов в соответствии с расположением сегментов кишки; нельзя оценить протяженность пристеночных патологических

изменений; невозможно осмотреть проксимальные отделы кишки при стенозах или обтурации ее нижних отделов, а самое главное, существует риск перфорации стенки кишки. Поэтому колоноскопия при дивертикулярной болезни должна выполняться строго по показаниям, которыми являются забор биопсийного материала и определение места кровотечения.

Ключевые слова: дивертикулярная болезнь, ободочная кишка, колоноскопия, чувствительность, специфичность

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Introduction. The widespread prevalence and frequent occurrence of severe diseases of the large intestine (LI) necessitate the use of modern and more accurate instrumental diagnostic methods, among which colonoscopy stands out. Undoubtedly, colonoscopy has the longest history in the study of the LI and the diagnosis of its various pathologies. Its value over the years has been the detailed visualization of all sections of the LI and the ability to perform targeted biopsies with subsequent morphological, histochemical, or microbiological examination of the obtained material [1]. Currently, colonoscopy is an effective minimally invasive instrumental method for performing many procedures, such as stopping bleeding and removing small benign neoplasms.

Colonoscopy traces its origins back to the late 18th century when the obstetrician Phillipe Bozzini, in 1806, published his article "A view of the internal parts of the body and manifestations of diseases", where he introduced his first "endoscope" (light conductor) [2]. Using this endoscope, the author was able to examine the rectum, vagina, and bladder. Since then, endoscopy in general and colonoscopy in particular have undergone several evolutionary stages: rigid; semi-flexible; fiber-optic; and electronic (video endoscopy) [3–5]. These advancements have created favorable conditions for the widespread use of colonoscopy in both inpatient and outpatient settings, enabling differential diagnosis in complex cases between various diseases during the preoperative period to determine the correct treatment strategy.

A question frequently discussed by many authors is the role of colonoscopy and its potential as an instrumental diagnostic method for colon diverticular disease (DDC), both complicated and uncomplicated. Until recently, colonoscopy was actively used for diagnosing CDD when there were limitations in the use of computed tomography (CT), and barium enema was not widely applied [6–9]. Currently, it is recommended for conducting differential diagnosis between diverticular disease (DD) on one hand and colorectal cancer (CC) and other inflammatory diseases of the colon on the other [10–13]. However, unfortunately, diverticula in the colon are often discovered during screening colonoscopy, which increases the risk of perforation due to the anatomical features of the intestine, deep mucosal folds, and constant peristalsis [14–16].

The aim of the study is to assess the opportunities and risks of colonoscopy as an instrumental method for screening colonic diverticular disease, as well as for diagnosing and differentially diagnosing its complications.

Materials and research methods. The study included two groups. The first group consisted of patients who underwent colonoscopy for screening and diagnostic purposes. From January 4, 2021, to December 31, 2024, 9 421 patients were examined, and diverticula of the colon were found in 1 754 of them, accounting for 18.6 %. The second group consisted of 121 patients in whom the presence of colonic diverticula was confirmed by other instrumental diagnostic methods. These patients underwent colonoscopy for the differential diagnosis of DD from other colonic pathologies, such as cancer or inflammatory diseases, during the same period. The effectiveness of colonoscopy was determined by evaluating its sensitivity and specificity in detecting pathological changes in the intestinal lumen, the intestinal wall, the mesentery, other abdominal and pelvic organs. The patient database for the second group was compiled in accordance with the requirements of our diagnostic chart for colonic diverticular disease using colonoscopy (Tab. 1). Bowel preparation was performed using laxatives containing polyethylene glycol, administered in one or two stages depending on the timing of the colonoscopy: from 14.00 to 19.00 (single-stage preparation), from 8.00 to 14.00 (two-stage preparation). The quality of bowel preparation was assessed using the Boston Bowel Preparation Scale (BBPS), with scores of 7, 8, or 9 considered optimal (Tab. 1).

T a b l e 1. **Diagnostic chart for colonic diverticular disease using colonoscopy (rationalization proposal – certificate No. 321/16 dated May 12, 2022, issued by the Belarusian Medical Academy of Postgraduate Education)**

<table>
<tr><td colspan="6">Full name:
Gender (F/M):
age
weight
height
Medical chart number:
Place of residence:
Time spent on the procedure, min:
Model of the device used:
filling time of protocol (date, month, year):</td><td colspan="3"> 
Segments of the large intestine</td><td colspan="4">Sedation: +/–
Method of preparation:
orthograde lavage
retrograde lavage
mixed
Quality of preparation
Boston scale: 7, 8, 9</td></tr>
<tr><td colspan="6">Segments of the large intestine</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr>
<tr><td rowspan="5">The wall of the colon</td><td colspan="5">Diameter, mm</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">Layers</td><td colspan="4">differentiated</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">poorly differentiated</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">not differentiated</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Thickness, mm</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="4">Gaustration</td><td colspan="5">Reinforced</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Absent</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Uneven</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Saved</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Mesenteric lymph nodes</td><td colspan="5">Enlarged</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Not enlarged</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">Intestinal blood stream</td><td colspan="5">Not defined</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Weak</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">Reinforced</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="9">Diverticula</td><td rowspan="3">Number</td><td colspan="4">≤ 4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">5–9</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">≥10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">Localization</td><td colspan="4">mesenteric margin</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">antimesenterial margin</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">mixed</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Size, mm</td><td colspan="4">largest</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">smallest</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="11">Complications</td><td rowspan="9">Acute</td><td rowspan="4">Covered perforation</td><td colspan="2">Diverticulitis with infiltrate <3 cm</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">Diverti-culitis with infiltrate >3 cm</td><td>edge deformation</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>stenosis</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>obturation</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="4">Perforation</td><td rowspan="3">Abscess,cm</td><td>paracolic</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>inter-loop abscess</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>pelvic</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Peritonitis (purulent/fecal)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="4">Chronic (fistulas)</td><td colspan="4">intestinal-cutaneous</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">colovesical</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">colovaginal</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="4">intestinal fistula</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="10">Distance between diverticula / how many pairs? <1 cm = ; 1–2,5 cm = ; 2,6–4 cm = ; >4 cm =</td></tr>
<tr><td colspan="7">Sigma: elongated single looped, two-looped, multi-looped</td><td colspan="3">Angle of rectosigmoid connection: <70°, 70–120°, >120°</td></tr>
</table>

End of Tab. 1

Angle of the diverticulum relative to the intestinal wall / number of diverticula with this angle: <20° ( ), 20–40° ( ), 41–60° ( ), >60° ( )
Other pathology of the intestinal lumen:
Other pathology of the intestinal wall:
Other pathology of the abdominal cavity:

N o t e. Distances between the diverticulas should be marked in pairs, so if there are two diverticulas closely located relative to each other, they make up one pair, we write 1 in parentheses, if 3 diverticulas are closely located relative to each other, they make up 2 pairs, the distance between the first and second, second and third should be measured and indicated in the Table.

Results and its discussion. To achieve our objective, two patient groups were formed: The group 1 comprised 9 421 patients, who underwent screening and diagnostic colonoscopy. Among them 5 802 (61.6 %) women, aged 18 to 96 years, 3 616 (38.4 %) men, aged 20 to 95 years. The primary indications for colonoscopy in this group included: abdominal discomfort and pain, changes in bowel habits, episodes of gastrointestinal bleeding, a family history of colorectal polyps and/or neoplasms in first-degree relatives. During the procedure, colonic diverticula were detected in 1 754 (18.6 %) patients with the following distribution across colonic segments: sigmoid colon – 1 191 (67.9 %) cases, left colon – 273 (15.6 %), transverse colon – 2 (0.1 %), right colon – 49 (2.8 %), combined left and right colon involvement – 61 (3.5 %), total colonic involvement – 178 (10.1 %) cases. The characteristics of these patients, including age distribution, frequency of diverticula, and their localization, are presented in Tab. 2.

T a b l e 2. **Characteristics of patients who underwent screening and diagnostic colonoscopy**

Indicator	Subgroup number						
	1	2	3	4	5	6	7
Age categories (10-year intervals)	≤30	31–40	41–50	51–60	61–70	71–80	>80
Total patients undergoing colonoscopy (n = 9 421)	389 (4.1 %)	554 (5.9 %)	1 167 (12.4 %)	1 777 (18.8 %)	3 035 (32.2 %)	1 997 (21.2 %)	502 (5.3 %)
Patients who were diagnosed with colon diverticula (n = 1754, 18.6 %)							
Patients with colonic diverticula (n = 1 754)	2 (0.1 %)	8 (0.5 %)	96 (5.5 %)	286 (16.3 %)	648 (36.9 %)	556 (31.7 %)	158 (9 %)
Patients per total group, % (in all 18.2 %)	0.02	0.08	1	3	6.7	5.8	1.6
Comparative statistical analysis between subgroups using χ^2 and p-value	1 and 2: $\chi^2 = 1.88$, $p = 0.17$ 1 and 5: $\chi^2 = 97.34$, $p = 0.0001$ 2 and 3: $\chi^2 = 30.43$, $p = 0.0001$ 3 and 4: $\chi^2 = 38.62$, $p = 0.0001$ 4 and 5: $\chi^2 = 19.43$, $p = 0.0001$ 5 and 6: $\chi^2 = 27.88$, $p = 0.0001$ 6 and 7: $\chi^2 = 2.59$, $p = 0.11$						

The comparative statistical analysis (χ^2 and p-values) across all subgroups demonstrates that the prevalence of colonic diverticula increases with age, with the most critical age being 61 years and older. Notably: subgroups 1 (≤30) and 2 (31–40) showed no statistically significant difference ($\chi^2 = 1.88$, $p = 0.17$). Subgroups 6 (71–80) and 7 (>80) also did not differ significantly ($\chi^2 = 2.59$, $p = 0.11$). Thus, it is methodologically justified to merge subgroups 1 and 2 (≤40 years) and subgroups 6 and 7 (≥71 years). After merging: diverticula prevalence in patients ≤40 years 0.6 %, diverticula prevalence in patients ≥71 years 40.7 % (based on colonoscopy findings). The degrees of freedom (D. F.) for this 2 × 2 contingency table were calculated as: D. F. = (2–1)(2–1) = 1. Unfortunately, colonoscopy is not always without risks. In some cases, complications may arise, including: Exacerbation of abdominal pain due to excessive air insufflation during the procedure; perforation of the intestinal wall, particularly at sites of diverticula (as illustrated in clinical case No. 1).

Clinical case No. 1. Patient R., born in 1951, underwent a colonoscopy on 17.02.2020 at the endoscopy unit of one of the district hospitals in the Republic, as recommended by a gastroenterologist. During the procedure, a perforation of the wall of the sigmoid colon occurred in the area where a diverticulum with wide openings was located, creating the illusion of the intestinal lumen. On 19.02.2020, the patient underwent surgery. A Hartmann's procedure was performed. Two months later, the patient was referred to a specialized department for a reconstructive-restorative operation. On 29.04.2020, a laparotomy was performed. During the exploration of the abdominal cavity, severe adhesions and an interloop abscess with perforation of the ileum 20 cm from the ileocecal angle were identified. The abscess cavity was sanitized, a bacterial culture was taken, and the wall of the ileum in the area of the abscess was sutured with interrupted stitches. The end sigmoidostomy was eliminated, and an end-to-side sigmoidorectal anastomosis was formed. The abdominal cavity was drained. The patient spent the first day after the surgery in the intensive care unit and was then transferred to the proctology department. On 03.05.2020, the on-duty doctors noted a deterioration in the patient's general condition and vital signs, which led to her transfer to the intensive care unit. Due to the ongoing deterioration, an ultrasound of the abdomen was performed on 04.05.2020. Findings: moderate diffuse changes in the liver. Signs of chronic cholecystitis. Diffuse changes in the pancreas. Cyst in the left kidney. Right-sided hydrothorax. Free fluid in the abdominal cavity. Diffuse changes in the renal parenchyma. Following the decision of the medical council, a relaparotomy was performed on 05.05.2020. After removing the sutures from the laparotomy wound, a large amount of turbid exudate was found in the abdominal cavity, with fibrin deposits on the loops of the small intestine. The loops of the small intestine were adhered and fixed by adhesions, which were then separated. Approximately 30 cm from the ileocecal angle, on the wall of the ileum involved in the adhesive process, there was an area of necrosis up to 0.5 cm in diameter with a perforation in the center measuring 0.2 × 0.2 mm, from which intestinal contents were leaking. The sigmoidorectal anastomosis and the sutured perforation of the ileum were intact. A loop ileostomy was created in the right iliac region. The abdominal cavity was sanitized, and the lateral canals were drained. The surgical wound was sutured in layers.

In the postoperative period, despite intensive therapy, the patient's condition deteriorated sharply. On 06.05.2020 at 00.20, cardiac arrest occurred. There was no pulse in the major (carotid and femoral) arteries. Pupillary light reflex was absent. Continuous cardiac monitoring showed a rare idioventricular rhythm on the ECG, progressing to asystole. Resuscitation measures were initiated: chest compressions at a rate of 100–120 compressions per min, continued mechanical ventilation using the insperation ventilator with the following parameters: VCV mode with FiO2 – 100 %, intravenous bolus administration of 1 ml of 0.18 % adrenaline every 3–5 min, and 1 ml of 0.1 % atropine intravenously, repeated every 5 min (total of 3 ml). After 10 min, 200 ml of 8.4 % sodium bicarbonate was administered. The ECG showed asystole. Despite full resuscitation efforts for 30 min, spontaneous circulation could not be restored, spontaneous breaths were absent, and the ECG showed asystole. Biological death was declared on 06.05.2020 at 00.50.

Group 2 consisted of 121 patients with confirmed CDD who underwent colonoscopy for differential diagnosis between diverticular disease and other colonic pathologies, such as cancer or inflammatory bowel disease. Demographics (sex distribution): women – 73 (60.3 %), men – 48 (39.7 %). Age range 35–86 years (mean age – 62 years). Localization of diverticula: sigmoid colon – 59 (48.8 %), left colon – 40 (33 %), right colon – 1 (0.8 %), transverse colon – 1 (0.8 %), combined right and left colon – 4 (3.3 %), total colonic involvement – 16 (13.2 %). According to our classification CDD: asymptomatic CDD – 25 (20.7 %), symptomatic uncomplicated CDD – 13 (10.7 %), complicated CDD – 83 (68.6 %). Complications of CDD among the 83 patients with complicated CDD, the following complications were observed: diverticulitis – 33 (39.8 %), covered perforation with marginal wall deformity – 12 (14.5 %), covered perforation with luminal stenosis – 23 (27.7 %), non-inflammatory infiltrate with stenosis due to mucosal invagination into diverticula – 3 (3.6 %), covered perforation with luminal obstruction (obstructive ileus) – 2 (2.4 %), abscess-forming covered perforation – 9 (10.8 %), bleeding – 1 (1.2 %).

Additional findings in group 2 patients. In addition to DD, the following comorbid pathologies were identified: malignant neoplasms – 15 (12.4 %) patients (cecum – 1 (6.7 %), hepatic flexure – 3 (20 %), transverse colon – 3 (20 %), sigmoid colon – 8 (53.3 %)). Colonic polyps were detected in various segments of the colon in 61 (50.4 %) patients. Diagnostic approach all examinations were conducted in accordance

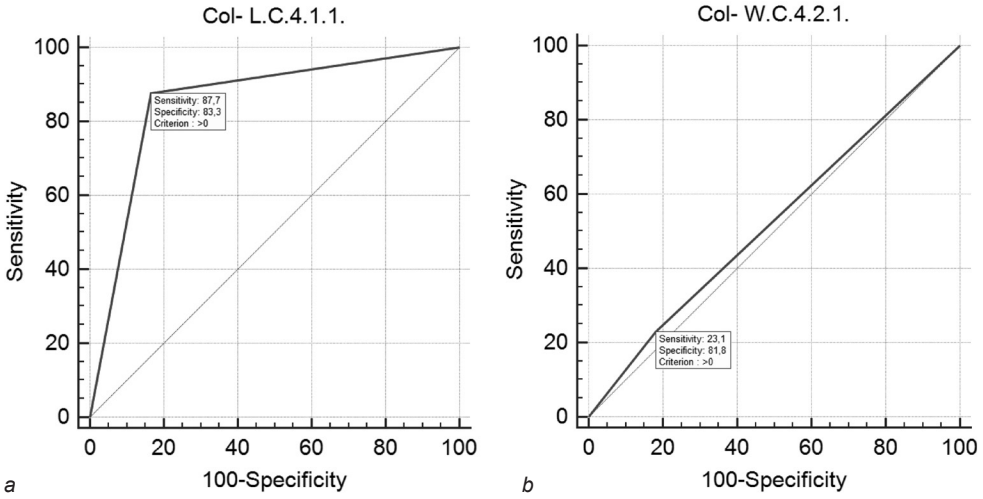


Fig. 1. Sensitivity and specificity of colonoscopy in diverticular colon disease: *a* – with pathological processes occurring in the lumen; *b* – with pathological processes occurring in the colon wall

with the diagnostic chart (Tab. 1). Confirmation of diverticula was initially established using other instrumental methods, including contrast-enhanced computed tomography (CT), which served as the "gold standard". Colonoscopy was then performed for differential diagnosis and further evaluation. Assessment of colonoscopy accuracy the sensitivity and specificity of colonoscopy were evaluated in relation to pathological processes in lumen of the colon, colonic wall, mesentery, other abdominal/pelvic organs associated with DD these results were compared with CT findings to determine diagnostic reliability.

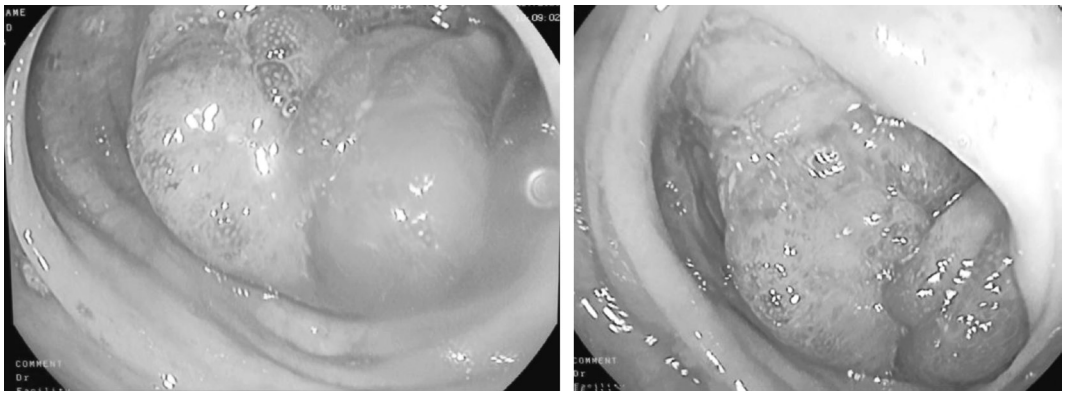
Diagnostic value of colonoscopy in CDD colonoscopy provides the following key advantages for evaluating the colonic lumen direct visualization without radiation exposure, video recording for retrospective analysis, biopsy sampling for histopathological differentiation (e. g., ruling out malignancy or IBD), precise localization of bleeding sites in cases of diverticular hemorrhage. Statistical performance metrics: AUC = 0.855, Se = 87, 95 % CI = 76.3–94.4; Sp = 83, 95 % CI = 35.9–99.6; +LR = 5.26, 95 % CI = 0.9–31.6; –LR = 0.15, 95 % CI = (0.07–0.3) (Fig. 1, *a*).

Assessment of colonoscopy efficacy in evaluating colonic wall pathology associated with DD unlike intraluminal evaluation, diagnosing colonic wall pathology in DD relies solely on indirect endoscopic signs, including: Wall rigidity and fixation during air insufflation. Purulent discharge from inflamed diverticula. Erosive changes and diverticula-associated colitis. Diagnostic performance metrics: AUC = 0.524, Se = 23.03, 95 % CI = 12.5–36.8; Sp – 81.8, 95 % CI = 48.2–97.7; +LR = 1.27, 95 % CI = 0.3–4.9; –LR = 0.94, 95 % CI = 0.7–1.3 (Fig. 1, *b*).

However, colonoscopy has a number of limitations that restrict its diagnostic capabilities in complicated cases of colonic diverticular disease. Specifically: It cannot assess the condition of paracolic fat, mesentery, or other abdominal/pelvic organs; precise localization of diverticula and inflammatory processes relative to intestinal segments is not always possible; the extent of parietal pathological changes cannot be properly evaluated; examination of proximal intestinal sections becomes impossible when stenosis is present in lower segments; the condition of paracolic tissue cannot be assessed.

Nevertheless, the fact remains that colonoscopy is an indispensable method for the differential diagnosis of CDD from inflammatory and cancerous conditions. However, clinical practice occasionally encounters cases where this proves impossible, particularly when CDD coexists with neoplasms of unclear origin that carry risks of bleeding or intestinal wall perforation, as illustrated in clinical case No. 2, which will be discussed subsequently.

Clinical case No. 2. Patient X., born in 1958 (65 years old), underwent a scheduled colonoscopy on November 17, 2023, as recommended by a surgeon at their local clinic due to a single episode of lower gastrointestinal bleeding, recurrent abdominal pain, and changes in bowel habits with a tendency toward constipation. Colonoscopy findings: at 44 cm from the anus, within the lumen and adjacent to deep diverticula, there was a protrusion of edematous, hyperemic mucosa, nearly obstructing the lumen, with areas of fibrin deposits? ulceration? (Fig. 2 *a*, *b*). Due to the high risk of perforation, the procedure



a *b*

Fig. 2. Sigmoid neoplasm (primary examination image) (*a*, *b*)

was discontinued. Conclusion: segmental sigmoiditis, possibly an inverted diverticulum with signs of diverticulitis (no biopsy was taken during the colonoscopy). With this diagnosis, the patient was referred to a specialized department. Comorbidities: ischemic heart disease (aortic cardiosclerosis); hypertension, stage 1, risk 4; chronic heart failure, functional class 1, grade 1 esophageal varices; papular gastropathy; focal mild atrophy of the gastric mucosa; duodenal lymphangiectasia; cardia insufficiency (incompetent cardia).

Upon admission to the hospital, all routine and biochemical blood test results were within normal limits.

Biochemical blood analysis: total protein – 72.8 (64–83) g/l, albumin – 43.7 (35–52) g/l, creatinine – 107.63 μmol/l, urea – 4.92 mmol/l, AST (aspartate aminotransferase) – 14.21 (5–40) U/l, ALT (alanine aminotransferase) – 8.13 (5–40) U/l, ALP (alkaline phosphatase) – 61.13 (53–128) U/l, Cl (chloride) – 103 (95–110) mmol/l, Na (sodium) – 140 (135–147) mmol/l, K (potassium) – 4.7 (3.5–5.2) mmol/l, Ca (calcium) – 2.43 (2.1–2.65) mmol/l, bilirubin (total) – 18.71 (9.5–32.2) μmol/l, glucose – 5.67 (4.1–6.4) mmol/l.

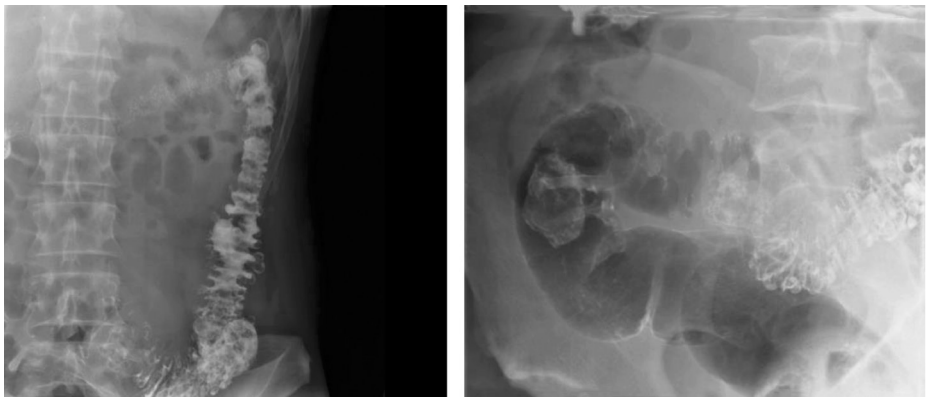
Complete blood count (CBC): RBC (red blood cells) – 4.5 (4.5–5.9) · 10^{12}/l, HGB (hemoglobin) – 135 (140–175) g/l (slightly below reference range), PLT (platelets) – 236 (150–450) · 10^{9}/l, PDW (platelet distribution width) – 12.6 (11–18) %, MPV (mean platelet volume) – 10.8 (9.1–12.1) fl, PCT (plateletcrit) – 0.25 (0.17–0.39) %, WBC (white blood cells) – 8.39 (4–9.5) · 10^{9}/l, EOS (eosinophils) – 1 (1–5) %, LYM (lymphocytes) – 30 (18–40) %, MON (monocytes): 9 (3–11) %, band neutrophils – 4 (1–6) %, segmented neutrophils – 56 (47–73) %, ESR (erythrocyte sedimentation rate) – 12 (2–10) mm/h (slightly elevated).

During hospitalization, the patient underwent an irigoscopy. The findings were as follows – diverticular disease of the left colon, space-occupying lesion in the distal sigmoid colon, periprocess (inflammatory/infiltrative changes) in the mid-sigmoid colon. Possible intussusception?? (Fig. 3). This further complicated the diagnostic process, adding to the initial confusion.

An ultrasound examination was additionally performed with detailed assessment of the colon. However, a definitive diagnosis could not be established. The findings revealed: Diverticular disease of the left colon, a large pedunculated polyp in the mid-sigmoid colon obstructing the lumen (Fig. 4). These findings further compounded the diagnostic uncertainty.

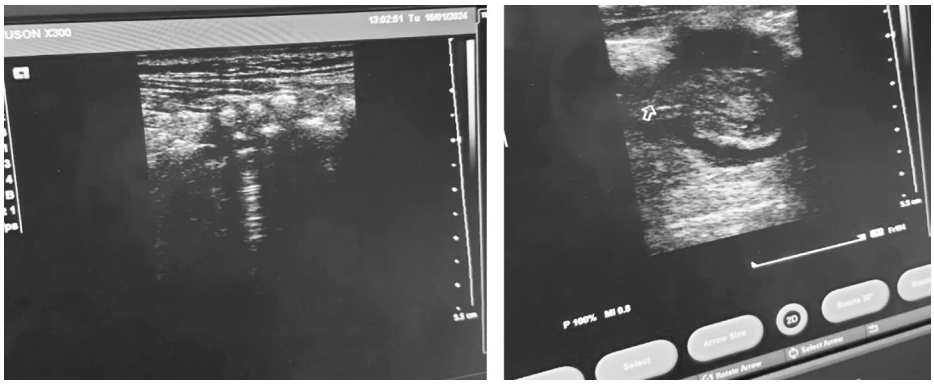
Based on the results of three diagnostic modalities (colonoscopy, barium enema, and ultrasound), the nature and origin of the sigmoid colon tumor process could not be definitively determined preoperatively. The clinical situation was discussed with the patient, emphasizing the necessity for surgical intervention. A left-sided mesocolectomy with end-to-end transverse-rectal anastomosis was performed after obtaining informed consent. Intraoperative findings: A non-inflammatory intramural infiltrate (5 × 6 cm) was identified in the sigmoid colon without mesenteric involvement (Fig. 5, *a*). Following our standard protocol, the resected bowel segment was opened extracorporeally, revealing tall, narrow, and highly mobile mucosal folds creating conditions for intussusception into adjacent diverticula, forming a tumor-like obstruction. Marginal necrosis in some folds due to strangulation (Fig. 5, *b*).

The postoperative period was uneventful. On postoperative day 15, a follow-up colonoscopy was performed to visually assess the surgical outcome. Findings: Status post left hemicolectomy with end-to-end transverse-rectal anastomosis, lumen and walls of the colon without pathological processes.



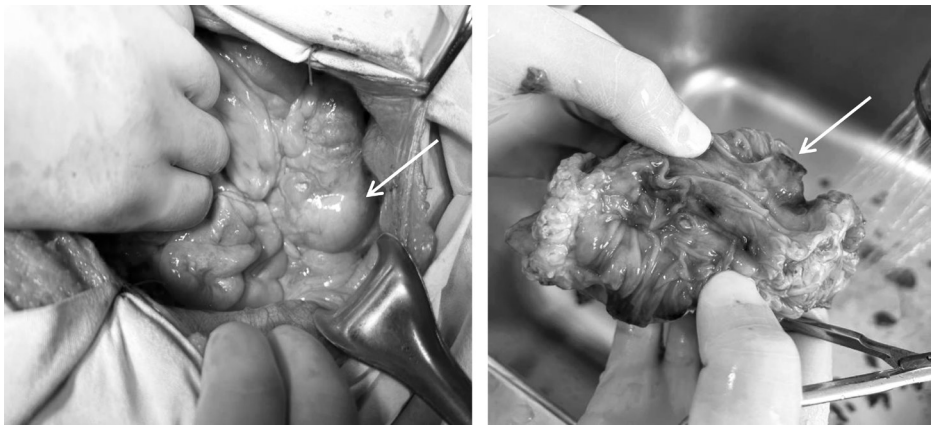
a *b*

Fig. 3. Irrigoscopy: *a* – diverticular disease of the left side of the colon;
b – polyp of the middle third of the sigma or intussusception?



a *b*

Fig. 4. Diverticula of the sigmoid colon (*a*) or pedunculated polyp in the sigmoid colon (*b)*?



a *b*

Fig. 5. Intraoperative image: *a* – a non-inflammatory parietal infiltrate resulting from mucosal intussusception into diverticula (arrow); *b* – marginal necrosis of the sigmoid colon mucosal folds (arrow)

Conclusion. Colonoscopy serves as a valuable diagnostic tool for evaluating pathological processes within the colonic lumen, though its effectiveness diminishes when assessing the intestinal wall and becomes completely non-informative for pathological changes in the mesentery or other abdominal/pelvic organs. Due to the inherent risk of intestinal perforation, colonoscopy is not considered a standard diagnostic procedure for CDD. Its use should be strictly limited to specific indications obtaining biopsy specimens and identifying the source of active bleeding.

Conflict of interest. The authors declare no conflict of interests.

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