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Original Paper

CORRELATION OF INTESTINAL ULTRASOUND DATA WITH LABORATORY MARKERS OF INFLAMMATION FOR PATIENTS WITH INFLAMMATORY BOWEL DISEASE

Natālija Jevdokimova[1,2,#], Denis Jevdokimov[1,2], Irena Teterina[3], Juris Pokrotnieks[1,4], Aldis Puķītis[1,2], and Viktorija Mokricka[1,4]

[1] Centre of Gastroenterology, Hepatology and Nutrition, Pauls Stradiņš Clinical University Hospital, 13 Pilsoņu Str., Rīga, LATVIA

[2] Faculty of Medicine, University of Latvia, 19 Raiņa Blvd., Rīga, LATVIA

[3] Faculty of Pharmacy, Rīga Stradiņš University, 16 Dzirciema Str., Rīga, LATVIA

[4] Faculty of Medicine, Rīga Stradiņš University, 16 Dzirciema Str., Rīga, LATVIA

[#] Corresponding author, natali6221@gmail.com

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Intestinal ultrasound is a new non-invasive imaging method that can be used for diagnostics of inflammatory bowel disease, to evaluate the response to therapy, and monitor serious complications of the disease in time. A prospective study was performed in Pauls Stradiņš Clinical University Hospital. Thirty patients were enrolled in the study: 21 patients with ulcerative colitis and 9 patients with Crohn's disease. Intestinal ultrasound was performed using Diagnostic Ultrasound System Arietta S70 (Hitachi, Japan). Intestinal wall structure (thickness), blood flow (Limberg score), intraluminal content, mesenteric fat hypertrophy and lymph nodes were evaluated, and laboratory markers of inflammation and clinical activity indices were analysed. Increased bowel wall thickness (BWT) (≥ 3 mm) was detected in 22 patients (73.3%), and wall stratification in 17 patients (56.7%). Using statistical analysis, it was concluded that there was a positive and statistically significant correlation between bowel wall thickness and ferritin ($r = 0.60$; $p < 0.001$), CRP ($r = 0.49$, $p = 0.006$), and faecal calprotectin ($r = 0.84$, $p < 0.001$). Intestinal ultrasound is a promising real time monitoring method for both Crohn's disease and ulcerative colitis, which showed statistically significant correlations between bowel wall thickness, bowel wall stratification, blood flow, laboratory markers of inflammation and clinical activity indices.

Keywords: *inflammatory bowel disease, intestinal ultrasound, Milan ultrasound criteria, SUS-CD score, IBD activity score.*

INTRODUCTION

Inflammatory bowel disease (IBD) includes two main diseases: ulcerative colitis and Crohn's disease. Ulcerative colitis causes inflammation in the colon, while Crohn's disease can affect any segment of the digestive tract (Peppercorn and Cheifetz, 2023). According to worldwide statistics, the prevalence for inflammatory bowel disease is approximately 321.2 cases per 100,000 persons per year (Caviglia *et al.,* 2023).

The signs and symptoms of inflammatory bowel disease usually depend on the area of the intestinal tract involved. The common systemic symptoms in IBD are arthralgia, loss of weight, fever and weakness (Rowe *et al.,* 2020). Ulcerative colitis damages the colon and is characterised by inflammation of the mucosal layer (Peppercorn and Kane, 2023). The main symptoms of ulcerative colitis are diarrhea (with or without visible blood), abdominal pain and tenesmus. Symptoms appear gradually and progress over several weeks (Peppercorn and Kane, 2023). Crohn's disease is

characterised by transmural inflammation and can damage any part of luminal gastrointestinal tract, from the mouth to the perianal area (Peppercorn and Kane, 2023). The main symptoms of the Crohn's disease are crampy abdominal pain and diarrhea (with or without bleeding signs). The transmural inflammatory process leads to fibrotic strictures. These strictures cause episodes of abdominal pain and small bowel obstruction, rarely, colonic obstruction. If inflammation is severe, it can create fistula with or without abscesses (Peppercorn and Kane, 2023). Also, inflammatory bowel diseases are characterised by extraintestinal manifestations. Most common manifestations are iron deficiency anaemia, arthropathy, uveitis, iritis, erythema nodosum, pyoderma gangrenosum, and osteoporosis (Peppercorn and Kane, 2023).

Ulcerative colitis and Crohn's disease diagnosis is based on laboratory, radiological, endoscopic and morphologic findings. Routine laboratory tests may be normal or show anaemia, and elevated C-reactive protein, erythrocyte sedimentation rate and ferritin (Peppercorn and Kane, 2023). Faecal calprotectin is a highly sensitive marker of gastrointestinal inflammation and is useful in differentiating inflammatory bowel disease from irritable bowel syndrome. Faecal calprotectin is used to diagnose, monitor disease activity, guide treatment, and predict disease recurrence in IBD (Pathirana *et al.,* 2018). Radiologic investigations used for diagnosis of IBD are abdominal radiography, abdominal computed tomography, and magnetic resonance enterography (Peppercorn and Kane, 2023).

Recently, the use of intestinal ultrasound (IUS) has become popular in diagnosis and monitoring of inflammatory bowel diseases. IUS is helpful in quick clinical decision-making and treatment adjustments, which can help change the progression of the disease. Intestinal ultrasound is non-invasive, real-time imaging and associated with low costs. The most important advantages of this investigation are the lack of special preparation, radiation, ability to be applied at the patient's bedside by the attending physician, safe imaging examination in pregnancy and without the need for contrast agents. This method can show and predict inflammation severity instantly and basic therapy can be managed without delay. The ileocolonoscopy with biopsies is the main method to assess the inflammation severity in IBD patients, but sometimes patients poorly tolerate it. Also, there exists the risk of intestinal perforation. In this case, IUS can be an alternative method. The most widely used imaging tools for IBD are magnetic resonance imaging (MRI) and computed tomography (CT), but both approaches have disadvantages: MRI is time-consuming and expensive, and CT carries the risk of radiation exposure. Intestinal ultrasound is as effective as CT and MRI for obtaining qualitative images of extraintestinal manifestations and transmural changes (Lin *et al.,* 2023).

The most common intestinal ultrasound's parameters used to define intestinal inflammation in patients with IBD diagnosis are bowel wall thickness (BWT) and bowel wall stratification (BWS). The bowel wall thickness is the distance from the border between the lumen and the mucosal layer, and the border between the serous layer and the muscle propria (Jauregui-Amezaga *et al.,* 2021). The usual normal values for the small intestine and large intestine are below 3 mm. The loss of bowel wall stratification and increased vascularisation assessed by colour Doppler flow (CDF) are also associated with bowel inflammation. Limberg score, a semiquantitative colour Doppler ultrasound assessment, is used for the bowel wall vascularity evaluation. Also, extramural features such as mesenteric fat proliferation and lymph nodes are essential features that are used to define inflammation severity (Kucharzik *et al.,* 2017). Score systems such as Milan ultrasound criteria (MUC) for ulcerative colitis and Simple Ultrasound Score for Crohn's Disease (SUS-CD) are used to use to assess and grade disease activity. The MUC is calculated according to the following formula: MUC = 1.4 × BWT (mm) + 2 × BWF; where BWF = 1 if present, or BWF = 0 if absent. Bowel wall flow (BWF) is defined as absence (0) or presence (1) of blood signals using colour Doppler flow. Ultrasound active disease is defined as a MUC score > 6.2 (Allocca *et al.,* 2018). The SUS-CD is calculated as the sum bowel wall thickness (BWT, mm) and Colour Doppler signal (CDS) for five bowel segments (*ileum, colon ascendens*, *colon transversum*, *colon descendens* and *rectum*). In this case, BWT is defined as: < 3.0 mm = 0; 3.0–4.9 mm = 1; 5.0–7.9 mm = 2; and ≥ 8.0 mm = 3. CDS is determined as: no or single vessel = 0; 2–5 vessels/cm^2 = 1; and > 5 vessels/cm^2 = 2. The maximum score of SUS-CD is 25 points (Freitas *et al.,* 2022; Saevik *et al.,* 2021). According to data from some research, a score ≥ 1 indicates active disease (Saevik *et al.,* 2021). The main aim of this study was to evaluate the correlation of intestinal ultrasound findings with the activity indices of inflammatory bowel disease.

The choice of treatment method of IBD depends on the degree of activity, disease location, course of the disease, frequency of exacerbations, extraintestinal manifestations, previously used drugs, medication side effects and individual preferences of the patient (Meier *et al.,* 2021). Ulcerative colitis confined to the rectum with mild to moderate activity should initially be treated locally with aminosalicylates (5-ASA) or topical steroids. Left-sided UC and ulcerative pancolitis should be treated locally with 5-ASA and oral mesalazine. During exacerbations, glucocorticoids are recommended orally or intravenously. If disease is refractory to medications, therapy escalation is needed: thiopurines or biological therapy (Meier *et al.,* 2021). Crohn's disease therapy options are immunomodulators such as azathioprine, 6-mercaptopurine, and methotrexate, and also biological drugs such as anti-TNF-α, anti-IL-12/23, and anti-integrin α4β7. If inflammation is in the terminal ileum then oral budesonide can be used (Cushing *et al.,* 2021).

The main goal of our study was to determine if correlation exists between bowel wall thickness, bowel wall stratification, colour Doppler signal and inflammatory markers such as haemoglobin, ferritin, CRP and faecal calprotectin.

MATERIALS AND METHODS

A prospective study was performed in Pauls Stradiņš Clinical University Hospital Gastroenterology, Hepatology and Clinical Nutrition Department and also in the outpatient clinic in October 2023 – January 2024.

Inclusion criteria were: either gender patient had appropriate IBD diagnosis, older than 18 years, patient agreed to participate in the research; patient was contactable, and able to understand questions and answer to them.

Exclusion criteria were: patient was younger than 18 years old, the patient did not agree to participate in the research, and the patient was unable to communicate.

The results of intestinal ultrasound, laboratory markers of inflammation such as haemoglobin (Hb), ferritin, C-reactive protein (CRP), faecal calprotectin and clinical interview data (special prepared questionnaire and IBD scoring disk) were analysed. The questionnaire included information about: patient demographic data such as gender, age, anthropometric indicators, duration of the disease, frequency of exacerbations, current treatment, comorbidity, history of smoking, signs and symptoms included in the Partial Mayo score and Crohn's Disease Activity Index (CDAI). CDAI is a scoring system used to explore the severity of inflammation. CDAI was categorised as follows: clinical remission (< 150), mild disease (150–220), moderate disease (220–450), and severe disease (> 450). The Mayo score for ulcerative colitis is a gold standard to assess disease severity. It can be used also for therapeutic drug monitoring. The maximum score was 12 points, and remission was considered when the score was lower than 2. In this study, the partial Mayo score was used.

IUS was performed using the Diagnostic Ultrasound System Arietta S70 (Hitachi, Japan), which was used to assess intestinal wall structure (thickness), blood flow (Limberg score), intraluminal content, mesenteric fat hypertrophy and lymph nodes. IUS criteria, MUC for ulcerative colitis and SUS-CD for Crohn's Disease disease activity were used.

IBM SPSS Statistics 29.0 software was used for statistical data analysis. Descriptive statistics were used to study the cohort. A value of $p < 0.05$ was considered to indicate statistical significance. The statistical reliability of the research data was analysed using Pearson's correlation coefficient for the linear relationship between two quantitative variables, and Independent Samples t-Test to determine statistically significant difference between two independent groups. Nominal variables were compared using the Fisher's exact test.

RESULTS

The study included 30 patients: 16 women (53.3%) and 14 men (46.7%). The age of the patients ranged from 22 to 76 years (M = 40, Me = 39, Mo = 25, SD = 12.57). The distribution of total prevalence among IBD patients was: ulcerative colitis — 70% (n = 21), Crohn's disease — 30% (n = 9). The mean duration of ulcerative colitis between patients was 7.5 years (SD = 5.38), but with Crohn's disease the diagnosis is 8.5 years (SD = 8.58).

In our study the biggest part of patients with ulcerative colitis received 5-ASA as basic therapy — 95.2% (n = 20), biological therapy — 23.8% (n = 5), immunosuppressants — 28.6% (n = 6), local glucocorticoids — 9.5% (n = 2), and systemic glucocorticoids — 28.6% (n = 6).

The biggest part of patients with Crohn's disease received immunosuppressants as basic therapy — 55.5% (n = 5), 5-ASA — 33.3% (n = 3), biological therapy — 33.3% (n = 3), local glucocorticoids — 11.1% (n = 1), and no one received systemic glucocorticoids.

IBD are associated with different comorbidities, including diseases of autoimmune origin. A larger proportion of patients had comorbidities — 56.7% (n = 17). The most common comorbidity of the patient cohort was iron deficiency anaemia — 30% (n = 9). Other comorbidities were: psoriasis — 10% (n = 3), seronegative spondyloarthropaty — 10% (n = 3), bronchial asthma — 6.7% (n = 2), gastroesophageal reflux disease — 6.7% (n = 2), and primary arterial hypertension — 6.7% (n = 2). The less common comorbidities were gout and rheumatoid arthritis — each 3.3% (n = 1).

Three patients (10%) presented with active lesions in the terminal ileum and 19 patients (63.3%) in the colon, among all study participants. Eight patients from all patients (26.7%) had normal intestinal ultrasound findings — six patients with UC and two patients with Crohn's disease. Among participants with Crohn's disease, 33.3% (n = 3) had active terminal ileitis and 44.4% (n = 4) had active colitis.

Increased wall thickness (≥ 3 mm) was detected in 22 patients (73.3%), loss of stratification of the bowel wall was detected in 17 patients (56.7%), mesenteric fat hypertrophy was detected in 9 patients (30%). Lymphadenopathy between participants did not occur. IBD complications as abscesses, bowel strictures and fistulas were not detected.

The Independent Samples t-Test showed statistical significant difference between bowel wall thickness and mesenteric fat hypertrophy occurrence ($p < 0.001$), and loss of stratification of the bowel wall ($p < 0.001$).

Laboratory inflammatory markers between ulcerative colitis and Crohn's disease differed (Table 1), but with no statistical significant difference between each inflammatory marker and IBD type group.

Using Pearson's correlation coefficient analysis, it was concluded that there was a positive, moderate and statistically significant correlation between bowel wall thickness and ferritin ($r = 0.60$, $p < 0.001$), and C-reactive protein ($r = 0.49$, $p = 0.006$). In addition, there was a positive, close and statistically significant correlation between bowel wall

Table 1. Inflammatory markers' values between IBD types

Inflammatory markers	IBD type	Number of patients, n	Mean value	Standard deviation, SD	*p* value
Haemoglobin, g/l	Ulcerative colitis	21	125.24	22.86	0.210
	Crohn's disease	9	135.56	11.07	
Ferritin, ng/ml	Ulcerative colitis	21	117.58	223.34	0.605
	Crohn's disease	9	162.44	193.56	
CRP, mg/l	Ulcerative colitis	21	28.78	47.94	0.961
	Crohn's disease	9	29.73	49.59	
Faecal calprotectin, µg/g	Ulcerative colitis	20	491.45	604.52	0.443
	Crohn's disease	8	701.79	746.96	

IBD, inflammatory bowel disease

thickness and faecal calprotectin (r = 0.84, $p < 0.001$) (Fig. 1). There was a negative, statistically non-significant correlation between BWT and haemoglobin (r = – 0.29; p = 0.119).

The Independent Samples t-Test showed significant difference between bowel stratification and faecal calprotectin ($p < 0.001$) (Fig. 2). However there was no significant difference between BWS and haemoglobin (p = 0.115), ferritin (p = 0.088), and CRP (p = 0.256).

There was a positive, close and significant correlation between colour Doppler signal (Limberg score) and faecal calprotectin (r = 0.85, $p < 0.001$). In addition, there was a positive, moderate and significant correlation between Limberg score and ferritin (r = 0.40, p = 0.028), CRP (r = 0.48, p = 0.008). In addition, there was a negative, moderate and significant correlation between Limberg score and haemoglobin (r = –0.47, p = 0.009), indicating that lower haemoglobin was associated with a higher Limberg score (Fig. 3).

The mean BWT for patients with ulcerative colitis in clinical remission (Partial Mayo score) was 2.7 mm (SD = 0.74), but in active disease (Partial Mayo score) — 5.2 mm (SD = 2.19). The mean BWT for patients with Crohn's disease diagnosis in clinical remission (CDAI score) was 5.7 mm (SD = 2.3), but in active disease (CDAI score) — 4.5 mm (SD = 1.43). Mean BWT calculation was performed for the most active intestinal segment.

There is a positive, moderate and significant correlation between BWT and Mayo clinical score (r = 0.63, p = 0.002) using Pearson's correlation coefficient analysis (Fig. 4),

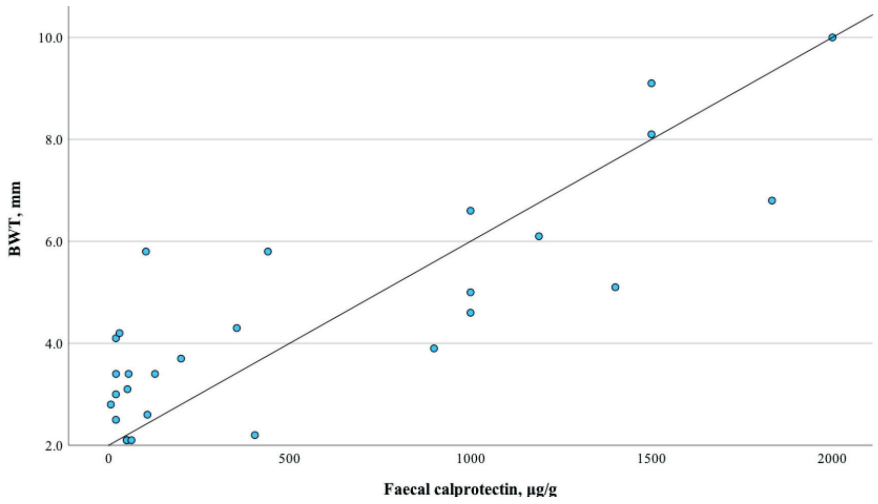

Fig. 1. Correlation between bowel wall thickness (BWT) and faecal calprotectin.

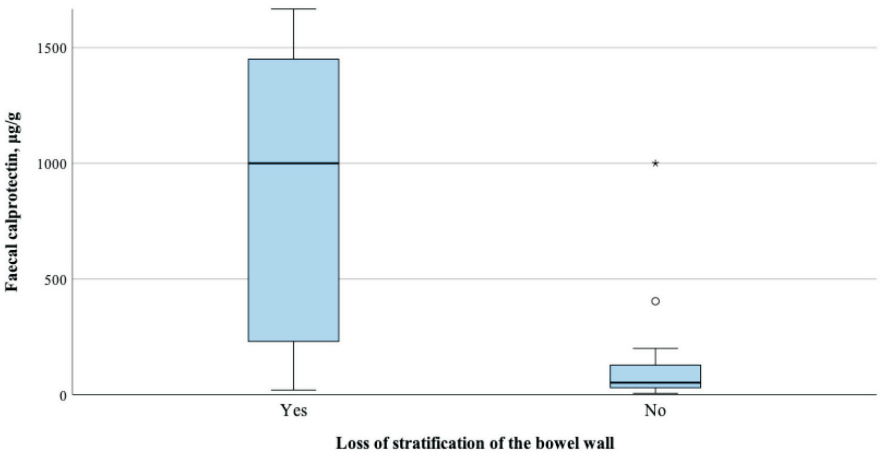

Fig. 2. Faecal calprotectin difference depending on the bowel wall stratification.

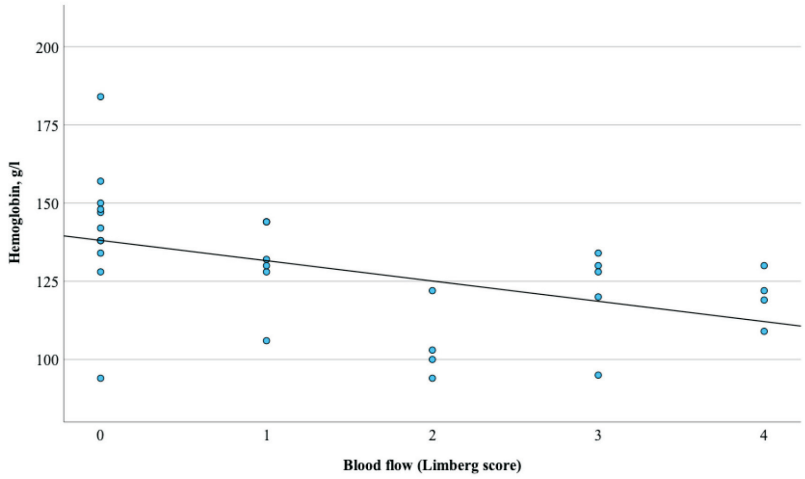

Fig. 3. Haemoglobin value's dependence on bowel wall blood flow (Limberg score).

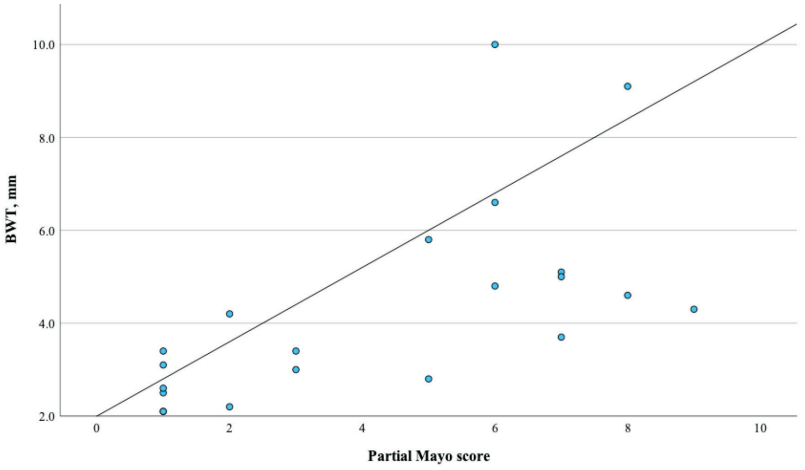

Fig. 4. Correlation between bowel wall thickness (BWT) and Partial Mayo score.

while there was no significant correlation between BWT and CDAI score (r = – 0.013, p = 0.974).

The Independent Samples t-Test showed significant difference between bowel stratification and Mayo clinical score (p = 0.015), while there was no significant difference between BWS and CDAI score (p = 0.191).

Pearson's correlation coefficient analysis showed a positive, close and significant correlation between Limberg score and Mayo clinical score (r = 0.76, p < 0.001) using, while there was no significant correlation between Limberg score and CDAI score (r = 0.08, p = 0.832).

Between IBD scoring disk and BWT (r = 0.316, p = 0.089), bowel wall blood flow (r = 0.28, p = 0.129) there was no significant correlation, while IBD scoring disk and BWS showed significant correlation (p < 0.05).

In addition, there was a positive, moderate and significant correlation between IBD scoring disk and Milan ultrasound criteria (r = 0.466, p = 0.033). However, between SUS-CD and IBD scoring disk there was no significant statistical correlation (r = 0.120, p = 0.759).

Based on Fisher's exact test statistical analysis, there was a significant relationship between Milan ultrasound criteria for UC and colon wall structural changes (p < 0.001).

The mean Milan ultrasound criteria score for ulcerative colitis in clinical remission (Partial Mayo score) was 4.1 (SD = 1.44), but for active disease (Partial Mayo score) — 9.0 (SD = 3.49). The mean SUS-CD score for Crohn's disease in clinical remission (CDAI score) was 3.5 (SD = 2.81), but for active disease (CDAI score) — 4.3 (SD = 4.93).

DISCUSSION

In our study, we evaluated the correlation between IUS parameters with inflammatory laboratory findings and clinical disease activity in patients with IBD diagnosis.

BWT is the main parameter during intestinal ultrasound that can predict IBD activity. According to the literature, a BWT > 3 mm in any segment in both diseases indicates severe disease (Dolinger et *al.,* 2023). In our study, the mean BWT for patients with ulcerative colitis active disease was 5.2 mm. The mean BWT for patients with active Crohn's disease was 4.5 mm. Many studies showed that the bowel wall thickness interval between 3 mm and 4 mm was a useful threshold for defining active disease in UC (Bezzio et *al.,* 2021). But in Crohn's disease, the mean BWT cut-off value of active disease can be 4.8 mm (Fang et *al.,* 2023).

The main goal of our study was to understand if correlation exists between bowel wall thickness, bowel wall stratifica-

tion, colour Doppler signal and inflammatory markers such as haemoglobin, ferritin, CRP and faecal calprotectin. According to our study the strongest correlation was between BWT and faecal calprotection (r = 0.84, $p < 0.001$). Similar findings were observed in other studies between these two parameters (Spearman's equation, r = 0.720, r = 0.740, and r = 0.750, $p < 0.001$) (Les et *al.,* 2019). In their study, the total number of patients was 32, which is close to the number of participants included in our study.

In addition, our observations indicated existence of a pattern — the higher the value of the faecal calprotectin the greater the disturbance of the bowel wall stratification. This was also shown in a previous study, which was published in 2019 (Les et *al.,* 2019).

We found a positive, close and significant correlation between colour Doppler signal (Limberg score) and faecal calprotectin (r = 0.85, $p < 0.001$), as observed previously in in 2023 (r = 0.446, $p < 0.05$) in a study with 44 patients having Crohn's disease (Statie *et al.*, 2023). A larger study including a greater number of patients (n = 121) showed a similar relationship (r = 0.56, $p < 0.05$) (Montero *et al.,* 2022).

CRP is one of the serum indicators of inflammation in IBD. It is one of the most studied laboratory markers. Our study showed positive, moderate and statistically significant correlation between bowel wall thickness and CRP (r = 0.49, $p = 0.006$). Another study also found a moderately strong positive correlation between intestinal wall thickness and CRP (r = 0.48 and 0.432, $p < 0.05$) (Ma et *al.,* 2020). Hat study included 30 patients — 20 males and 10 females. The patients were aged 20–70 years, and the average age for the entire cohort was 43 years, which is very similar to our cohort.

In our study we found a positive, moderate and significant correlation between bowel wall blood flow and CRP (r = 0.48, $p = 0.008$), as found also in another study (r = 0.238, $p < 0.05$) (Montero *et al.,* 2022).

Ferritin is serum marker that is used in diagnosing iron deficiency anaemia and rarely as an inflammatory marker. In IBD patients without data on inflammation, iron deficiency is indicated by a serum ferritin mcg/l. When inflammation occurs (elevated CRP), serum ferritin levels below 100 mcg/L should be considered abnormal (Gisbert et *al.,* 2008). No study exists that reported a correlation between ferritin, BWT, and Limberg score. However, our study demonstrated a positive, moderate and significant correlation between ferritin and bowel wall thickness (r = 0.60; $p < 0.001$), and Limberg score (r = 0.40, $p = 0.028$).

Anaemia is a common manifestation in IBD patients. Approximately 30% of patients with IBD have haemoglobin levels below 12 g/dLl (Kaitha et *al.,* 2015). Our study showed no relationship between BWT, BWS and haemoglobin level. In addition, there are no sources that provide information about this correlation.

The Mayo score is used to monitor clinical activity of ulcerative colitis. In our study, we used the Partial Mayo score, because some patients included in study did not have new colonoscopy data. We concluded that there was a positive, moderate and significant correlation between BWT and Mayo clinical score (r = 0.63, $p = 0.002$). A previous study showed that intestinal wall thickness and Mayo score were strongly positively correlated (r = 0.703, $p < 0.05$) (Chao et *al.,* 2020). That study also showed no significant correlation between bowel wall thickness and CDAI ($p > 0.05$), which used to monitor CD activity, as shown in our study ($p = 0.974$). Unfortunately, these scales are based on patient-dependent data, which are subjective, and rely on the patient understanding of the information.

We concluded that there was non-significant correlation between Limberg score and CDAI score (r = 0.08, $p = 0.832$). Nevertheless in a study that included only Crohn's disease patients (n = 44) there was a positive significant correlation (r = 0.667, $p < 0.001$) (Statie *et al.,* 2023). The different number of patients involved in the study can explain this difference.

Based on the results of intestinal ultrasound we calculated Milan ultrasound criteria for UC and SUS-CD for CD. In our study, the mean Milan ultrasound criteria score for active disease was 9.0 points. Information from literature demonstrated that a MUC score ≥ 6.3 indicates active inflammation (Furfaro et *al.,* 2021). In our study, the mean SUS-CD for active Crohn's disease was 4.3, but for clinical remission — 3.5. Some other studies suggest that that a SUS-CD score ≥ 1 points out active disease (Freitas *et al.,* 2022). However, it is worth emphasising that the results depend on the number of participants in the study cohort.

Table 2. Summary of correlation coefficients (r) between IUS parametrs and laboratory markers of inflammation, clinical activity indices

IUS parameters	Faecal calprotectin, μg/g	CRP, mg/l	Hb, g/l	Ferritin , ng/ml	IBD scoring disk	Partial Mayo score	CDAI
BWT	r = 0.84 $p < 0.001$	r = 0.49 $p = 0.006$	r = –0.29 $p = 0.119$	r=0.60 $p < 0.001$	r = 0.316 $p = 0.089$	r = 0.63 $p = 0.002$	r = –0.013 $p = 0.974$
BWS	$p < 0.001$	$p = 0.256$	$p = 0.115$	$p = 0.088$	$p < 0.05$	$p = 0.015$	$p = 0.191$
Limberg score	r = 0.85 $p < 0.001$	r = 0.48 $p = 0.008$	r = –0.47 $p = 0.009$	r = 0.40 $p = 0.028$	r = 0.28 $p = 0.129$	r = 0.76 $p < 0.001$	r = 0.08 $p = 0.832$

IUS, intestinal ultrasound; CDAI, Crohn's Disease Activity Index; BWT, bowel wall thickness; BWS, bowel wall stratification

CONCLUSIONS

IUS is non-invasive imaging tool to evaluate IBD activity in real time. Intestinal ultrasound parameters such as BWT, BWS and Limberg score showed statistically significant correlation with markers of inflammation such as CRP, ferritin and faecal calprotectin (Table 2). We concluded that, a lower haemoglobin value results in a higher Limberg score.

Intestinal ultrasound features, Milan ultrasound criteria score and SUS-CD score could indicate inflammatory bowel disease activity (CDAI, Mayo score).

Our data showed positive, moderate and significant correlation between IBD disk and MUC. There was no significant correlation between SUS-CD and IBD disk data.

We can strongly recommend intestinal ultrasound for gastroenterologists to control the disease course in IBD patients.

ETHICS

Study participants were informed about the research using a special informed consent form, which included information about the study. The research protocol was approved by the Ethics Committee for Clinical Research at Development Society of Pauls Stradiņš Clinical University Hospital (Reference Number: 280923 – 7L).

CONFLICT-OF-INTEREST

The authors declare no conflict of interest.

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ZARNU ULTRASONOGRĀFIJAS KLĪNISKĀ NOZĪME IEKAISĪGO ZARNU SLIMĪBU AKTIVITĀTES NOVĒRTĒŠANAI UN KORELĀCIJA AR IEKAISĪGO ZARNU SLIMĪBU AKTIVITĀTES MARĶIERIEM

Zarnu ultrasonogrāfija ir jauna neinvazīva attēldiagnostikas metode, kas ļauj diagnosticēt un vadīt iekaisīgu zarnu slimību (čūlains kolīts un Krona slimība) gaitu. Ar ultrasonogrāfijas metodi var veikt iekaisīgu zarnu slimību monitoringu, izvērtēt atbildi uz terapiju, kā arī savlaicīgi novērst smagas slimības komplikācijas. Zarnu ultrasonogrāfija ir ērta un precīza metode, ir neinvazīva alternatīva endoskopijai un magnetorezonanses izmeklējumam. Galvenais pētījuma mērķis ir izvērtēt zarnu ultrasonogrāfijas atradnes korelāciju ar iekaisīgo zarnu slimību aktivitāti. Pētījuma ietvaros prospektīvi tika analizēti pacientu laboratoriskie (hemoglobīns, ferritīns, C-reaktīvais olbaltums, kalprotektīns), radioloģiskie un speciāli izstrādātas anketas dati. Kopā pētījumā tika iekļauti 30 pacienti (vidējais vecums 40 gadi) – 21 pacients ar čūlaino kolītu un 9 pacienti ar Krona slimību. Zarnu ultrasonogrāfija tika veikta, izmantojot diagnostikas ultraskaņas sistēmu Arietta S70 (Hitachi, Japāna). Statistiskai datu analīzei tika izmantota *IBM SPSS Statistics 29.0* versija. Pētījuma gaitā tika secināts, ka pastāv pozitīva un statistiski ticama korelācija starp zarnu sieniņas biezumu, izzudušām robežām starp zarnu sieniņas slāņiem, vaskularitāti (Limberga skalu) un ferritīnu, C-reaktīvo proteīnu, kalprotektīnu. Negatīva statistiski ticama korelācija pastāv starp zarnu sieniņas vaskularitāti un hemoglobīnu (r=-0.47, p=0.009). Tas norāda, ka jo zemāks ir hemoglobīna līmenis, jo augstāka ir Limberga skalas vērtība. Kā arī pētījuma rezultāti liecina: jo augstākas ir kalprotektīna vērtības, jo izteiktāk izzūd robežas starp zarnu slāņiem ($p < 0.001$). Balstoties uz veiktā pētījuma rezultātiem, tika secināts, ka ar zarnu ultrasonogrāfijas palīdzību iespējams izvērtēt slimības aktivitāti un nekavējoties veikt bāzes terapijas korekciju atbilstoši atradnei.