Journal of Biomedical Sciences | ISSN: 2960-9356
Research Article Peer-review, Open Access
World of Medicine: Journal of Biomedical Sciences Vol .3 No. 5 (2026)
https://wom.semanticjournals.org/index.php/biomed

Diagnostic Accuracy of Bowel Ultrasound Compared with Colonoscopy for Assessing Disease Activity in Patients with Ulcerative Colitis

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Abstract: Accurate assessment of disease activity is important to effectively treat ulcerative colitis (UC) which is a chronic inflammatory bowel disorder. Colonoscopy is considered the gold standard for assessing mucosal inflammation, but is limited in its use because of its invasive nature. This approach has led to the use of bowel ultrasonography as a promising non-invasive method of monitoring disease. The aim of this study was to assess the roles of bowel U/S for measuring disease activity in patients with UC and explore its relationship with the colonoscopic findings and inflammatory markers. Methods: The study involved a prospective observational study of 90 patients with confirmed ulcerative colitis, who were clinically evaluated, subjected to laboratory, bowel ultrasonography and colonoscopy examinations. Based on disease activity, Mayo Endoscopic Subscore (MES) was used. The parameters of ultrasound of the bowel wall thickness, bowel wall stratification, Doppler vascularity, hypertrophy of the mesenteric fat, enlargement of the lymph nodes and the presence of free peritoneal fluid were evaluated and compared with those of endoscopy. Appropriate statistical tests were used to perform correlation analyses, diagnostic performance measures and agreement statistics. Findings: Bowel wall thickening was most prevalent sonographic change (72.2%) and Doppler vascularity the next most prevalent type (66.7%). Bowel wall thickness, Doppler scores, and the number of patients that showed loss of wall stratification were significantly greater in patients with active disease (MES 2–3) compared to patients with inactive or mild disease. The overall accuracy of bowel ultrasonography was very good with a sensitivity of 91.4%, and a specificty of 84.4%, an area under the receiver operating characteristic curve of 0.93. There was a significant degree of agreement between the two methods (Cohen's $\kappa = 0.79$, $P < 0.001$) for substantial agreement. There were significant positive correlations between bowel ultrasound finding, inflammatory markers (CRP and ESR) and Mayo Endoscopic Score. Bowel ultrasonography is an accurate, safe, non-invasive imaging method of great value, which highly corresponds with endoscopic disease activity and inflammatory markers. It may be a worthwhile instrument to be used in routine assessment and serial evaluation of patients with UC and would help to minimize the need for repeat invasive colonoscopic examinations.

Keywords: Ulcerative colitis; Bowel ultrasonography; Colonoscopy; Mayo Endoscopic Score; Disease activity.

Introduction

Ulcerative colitis (UC) is a chronic, idiopathic inflammatory bowel disease (IBD) that starts in the rectum and moves up continuously [1]. It has a relapsing-remitting course and initial symptoms are usually bloody diarrhea, rectal bleeding, abdominal pain, frequency and tenesmus. However, the exact cause is not fully clear; ulcerative colitis is thought to be a combination of genes, the environment, gut microbes, and immune system overactivity [2]. Such mechanisms cause chronic mucosal inflammation, subsequent

continuous tissue damage and a decrease of intestinal function. Ulcerative colitis currently ranks as an important public health problem and during the last decades the incidence and the prevalence of the disease has definitely risen, especially in newly industrialized countries, where it was rarely reported decades ago, with important clinical and economic consequences [3].

A reliable measure of disease activity is essential in order to maximize the management of patients with ulcerative colitis. More recent treatment strategies focus on a 'treat-to-target' concept, in which assessment of intestinal inflammation should be objective rather than based exclusively on clinical symptoms used to guide treatment decisions [4]. A key treatment objective is the endoscopic healing, due to persistence of clinical remission, fewer hospitalizations, fewer colectomies and improved quality of life. Reliable measurement of the disease burden of mucosal inflammation is therefore crucial in the assessment of disease severity, in determining the response to therapy, and predicting long term outcomes [5,6].

Colonoscopy has been the reference standard for the assessment of disease activity in ULC because it allows direct observation of the colonic mucosa, establish the extent of the disease, validate disease activity scores like the Mayo Endoscopic Subscore and provide biopsy samples for histopathological study [7]. Although it remains the most useful test, colonoscopy is an invasive procedure that requires bowel preparation, sedation in most patients, and requires specialized endoscopic facilities and has a very small, but definite risk of complications, such as bleeding and perforation [8]. Frequent colonoscopic follow-up may also decrease acceptance of this treatment and drive-up health care expenditures, especially for those who need routine follow-up [9].

Bowel ultrasonography has become an appealing minimally invasive imaging tool to assess IBD. Recent development of high-resolution ultrasound and color Doppler implementation has greatly enhanced the perception of the bowel wall morphology and vascularity [10]. Bowel wall thickness, stratification of the bowel wall, immediate loss of stratification, vascularity of the wall, hypertrophy of the mesenteric fat, enlarged mesenteric lymph nodes and presence of free fluid in the abdomen can be assessed by ultrasound [11]. Such sonographic characteristics are demonstrated to correspond to the severity of intestinal inflammation and have been found to comfortably correspond with endoscopy-based disease activity. Moreover, bowel ultrasound is harmless, has low cost, high availability, repeatability and is well-tolerated by patients, and is thus ideally suited for follow-up studies [12].

Bowel ultrasonography is now gaining acceptance to the world as a beneficial tool for the assessment and follow-up of inflammatory bowel disease (IBD) as reflected by recent international guidelines and consensus statements from the European Crohn's and Colitis Organization (ECCO), the European Society of Gastrointestinal and Abdominal Radiology (ESGAR) and the International Bowel Ultrasound Group (IBUS) [13]. Many studies have reported high correlations between bowel wall thickness, Doppler vascularity and the endoscopic severity and demonstrated that bowel ultrasound has high sensitivity and specificity for the detection of active disease. However, there are different reports on the diagnostic performance which are due to differences in patient groups, ultrasound techniques, operator experience, and tumor features [14,15].

Furthermore, information about the utility of bowel ultrasonography in routine practice is still limited in many developing countries such as Iraq there might be limited access to some advanced imaging modalities and repeated Bowel Endoscopic evaluation. We sought to investigate the diagnostic utility of bowel ultrasonography in the estimation of disease activity in patients with ulcerative colitis and its correlation with findings at colonoscopy (Mayo Endoscopic Subscore) and inflammatory laboratory markers.

Materials and Methods

Study Design and Setting

A prospective cross-sectional diagnostic accuracy study to compare the diagnostic performance of bowel ultrasonography and colonoscopy in the diagnosis of colitis activity in patients diagnosed with ulcerative colitis was performed. The study was conducted at the Gastroenterology Unit of Tikrit Teaching Hospital in Salah Al-Din district and Radiology department during a period of 12 months from March 2025 till March 2026. Bowel ultrasound was performed on all eligible participants within 7 days of colonoscopy to minimize the risk of change in disease activity between the two procedures. The radiologists who did

the ultrasounds were blinded to the colonoscopy findings and the gastroenterologists who interpreted the colonoscopies were blinded from the ultrasound findings.

Study Population

During the study period 90 patients with a diagnosis of or history of ulcerative colitis were consecutively enrolled. Male and Female patients were included. The ages of the people that were included in the study ranged from 18 to 70, which encompasses the majority of adults who suffer from inflammatory bowel disease. Patients were referred to be evaluated for the presence of disease activity, in the outpatient and in-ward clinic of the gastroenterology referral department.

Sample Size

The study comprised 90 patients, which is considered a large enough sample to assess the accuracy of bowel ultrasound compared to colonoscopy and also enable a statistically meaningful comparison of the imaging data with the colonoscopic data reflecting disease activity. To avoid selection bias to ensure that all the eligible patients presented during the study period had equal opportunity, consecutive sampling was used.

Inclusion Criteria

Patients were included if they had a diagnosis of ulcerative colitis confirmed by clinical history, endoscopy, and/or biopsy, or if the diagnosis was strongly suspected and colonoscopy was clinically indicated. Every subject aged 18 years or older who was able to give informed consent was eligible to be a participant. Bowel ultrasonography and colonoscopy were completed within a week of each other for all the patients included in the final analysis.

Exclusion Criteria

Patients were excluded if they had Crohn's disease, indeterminate colitis, previous colectomy, colorectal malignancy, severe bowel obstruction, pregnancy, were unable to have a colonoscopy, prior mucosal preparation was insufficient to allow for assessment of the bowel mucosa, or the ultrasound was also incomplete. Kinds of surgery that led to severe distortion of the abdomen were also contraindicated, such as significant abdominal surgery.

Clinical Assessment

A thorough clinical examination was done beforehand the imaging process. Data on the patients' demographic characteristics, such as age at interview, sex, disease duration, smoking history, body mass index, current medications and previous hospital admissions due to ulcerative colitis were collected. Clinically, the extent of the disease was evaluated by a Partial Mayo Score; Laboratory parameters: complete blood count, C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), serum albumin, and fecal calprotectin (when available).

Bowel Ultrasound Examination

All ultrasound examinations were carried out with the GE ultrasound system Voluson S10 of GE-Healthcare (Zipf, Austria) at Tikrit Teaching Hospital. A linear array transducer (4–13 MHz) was used to image superficial bowel segments and a convex transducer (2–5 MHz) was used to assess surrounding abdominal structures and to image the deeper bowel segments.

Patients were asked to be NPO for ~6 hours prior to exam to empty the bowel of gas and make it easier to see. Oral radiopaque studies and bowel preparation were not performed prior to ultrasonography. The examination was performed in supine position and also on the left lateral decubitus position of patient. Systems scanning was done from the Cecum through the rectosigmoid colon, guaranteeing all accessible parts of the colon were evaluated.

Initially gray scale ultrasound was used to assess the morphology of the bowel wall and then color Doppler imaging was used for the evaluation of the vascularity of the walls. The speed of the pulse repetition frequency (500-800 Hz), the wall filter (set at low level), the color gain (set just below the noise threshold) and the angle of insonation (less than 60°, when possible, to maximize detection of low blood flow) were optimized.

Ultrasound Parameters

Multiple sonographic parameters of inflammatory activity have been analyzed. The thickness of the bowel wall was measured from the lumen to the outer part of the muscularis propria. Bowel wall thicknesses greater than 3 mm were regarded as being abnormal. Normal stratification of the bowel wall was documented in cases where it was present and absent, and the mural echogenicity of bowel as well

as the presence of inflammatory pseudopolyps was recorded when they were present.

Mural vascularity was assessed using the Colour Doppler imaging system which was graded semi-quantitatively, as per the Limberg Doppler score. Other sonographic features were also reported such as the presence of mesenteric fat hypertrophy, enlarged mesenteric lymph nodes, free intraperitoneal fluid, absence of haustration, bowel dilatation, and inflammatory changes of surrounding tissues. The measurements were taken from the most severely affected bowel segment found at exam.

Colonoscopy Examination

High-definition video colonoscopes were used to perform conventional ileocolonoscopy after traditional bowel preparation with polyethylene glycol solution by experienced consultant gastroenterologists. Clinically when appropriate, conscious sedation was used. When it was technically possible the endoscopists examined the rectum, sigmoid colon, descending colon, transverse colon, ascending colon, cecum and terminal ileum by systematically proceeding.

Mayo Endoscopic Subscore (MES) was used for the assessment of endoscopic disease activity. The score was used to indicate the severity of the disease: inactive disease (MES 0), mild inflammation (MES 1), moderate inflammation (MES 2) and severe inflammation (MES 3). When clinically indicated, biopsy specimens were taken from representative areas of inflammation for confirmation of diagnosis by histopathological examination.

Reference Standard

Reference standard used to assess disease activity was colonoscopy. The diagnostic performance of bowel ultrasonography was compared directly to the Mayo Endoscopic Subscore to determine whether the Mayo Endoscopic Subscore is superior to bowel ultrasonography. Currently, it was quite common to use the Endoscopic Subscore of Mayo to identify active disease and remission or mild disease with a score of 0 and 1, respectively.

Outcome Measures

The main result of the study was the validity of bowel ultrasonography to diagnose active ulcerative colitis. Secondary endpoints included the correlation of bowel wall thickness with endoscopic severity, the correlation between Doppler vascularity with inflammatory activity, and the correlation between sonographic parameters with inflammatory laboratory markers such as C-reactive protein (CRP), erythrocyte sedimentation rate (ESR) and fecal calprotectin.

Data Collection and Quality Control

The clinical, laboratory, immunohistochemical, imaging and endoscopy data were all recorded onto the specially designed data collection forms that are used to homogenously capture all the data. The sonologists who conducted ultrasound exams were experienced in gastrointestinal sonography with more than 5 years of work experience. The colonoscopies were interpreted independently by consultant gastroenterologists. To minimize observer bias, each imaging modality was analyzed without knowledge of results from the other imaging modality. Periodic audit check and double entry checks were performed to verify data before it is analyzed statistically.

Ethical Considerations

Prior to patients' recruitment, the study protocol was reviewed and approved by the Institutional Scientific and Ethical Committee of the College of Medicine, Tikrit University and Tikrit Teaching Hospital. Informed consent was obtained in writing from all participants, and informed consent was given after explaining to participants the purpose, methodology, potential benefits, and the possible risks involved in participating. All information about patients was kept confidential, with anonymous identification codes and limited access to the data by the research team.

Statistical Analysis

A statistical analysis was carried out employing IBM SPSS Statistics version 27.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as mean ± SD for continuous variables and frequencies and percentages for categorical variables. Chi square or Fisher's exact test were used for categorical variables and independent samples t test, ANOVA or Mann Whitney U test for continuous variables depending on the data type. Pearson's or Spearman's correlation coefficients were calculated to examine the correlation between ultrasound data and colonoscopic disease activity. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), diagnostic accuracy, and the area under the ROC curve (AUC) were calculated to aid in the evaluation of the diagnostic performance. The

accuracy of bowel ultrasound in relation to colonoscopy was evaluated by Cohen's Kappa coefficient. The statistical significance was defined as P value < 5%.

Results

Baseline Characteristics of the Study Population

Demographic and clinical features of the enrolled participants are related in Table 1. There were 90 patients of ulcerative colitis recruited. The population examined were slightly more male with a mean age of 39.8 ± 12.4 years. At presentation most of the patients had mild clinical disease activity.

Table 1. Baseline demographic and clinical characteristics of the study population

Variable	Value (n=90)
Age (years), Mean ± SD	39.8 ± 12.4
Age range (years)	18–70
Male, n (%)	49 (54.4)
Female, n (%)	41 (45.6)
Disease duration (years), Mean ± SD	5.3 ± 3.1
BMI (kg/m²), Mean ± SD	25.9 ± 4.6
CRP (mg/L), Mean ± SD	19.6 ± 11.8
ESR (mm/hr), Mean ± SD	35.4 ± 16.2
Albumin (g/dL), Mean ± SD	3.7 ± 0.5
Partial Mayo Score, Mean ± SD	5.8 ± 1.9

Endoscopic Disease Activity

The distribution of disease severity according to the Mayo Endoscopic Subscore is shown in Table 2. The largest subgroup was moderate (Fig. 1).

Table 2. Distribution of patients according to Mayo Endoscopic Subscore

Mayo Endoscopic Subscore	n	%
MES 0	12	13.3
MES 1	20	22.2
MES 2	34	37.8
MES 3	24	26.7

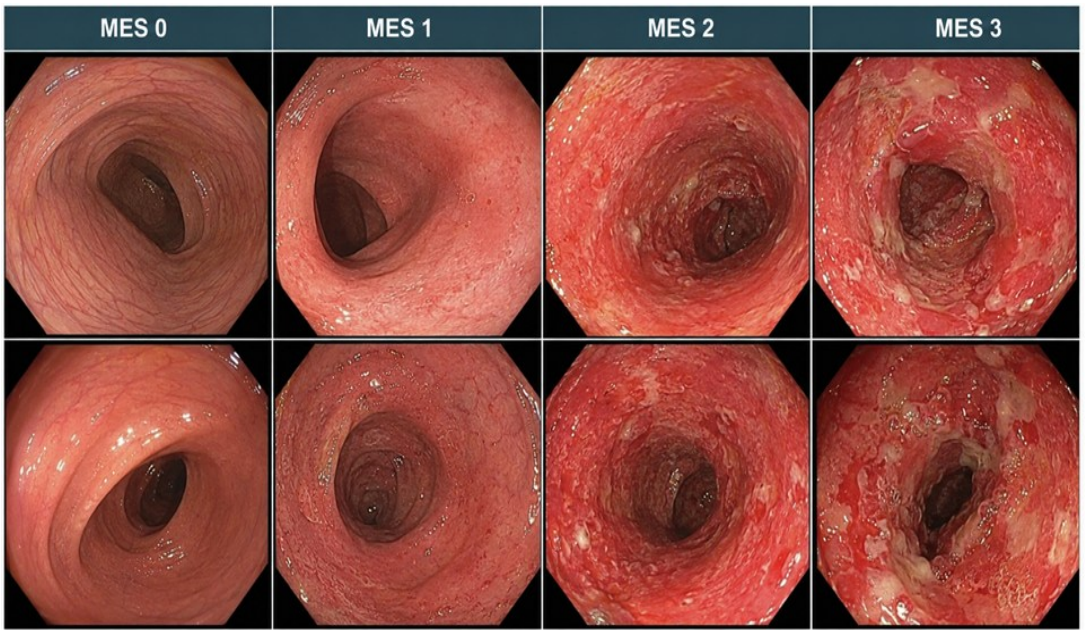

Figure 1. Colonoscopic images representing Mayo Endoscopic Scores 0–3.

Bowel Ultrasound Findings

The main findings of the gastro-intestinal ultrasound is presented in Table 3. The most common abnormalities were thickening of bowel wall (Fig. 2) and hypervascular of the bowel wall (Fig. 3).

Table 3. Sonographic findings

Ultrasound Finding	n	%
Bowel wall thickness >3 mm	65	72.2
Loss of wall stratification	46	51.1
Increased Doppler vascularity	60	66.7
Mesenteric fat hypertrophy	39	43.3
Enlarged mesenteric lymph nodes	24	26.7
Free intraperitoneal fluid	11	12.2
Loss of haustration	21	23.3

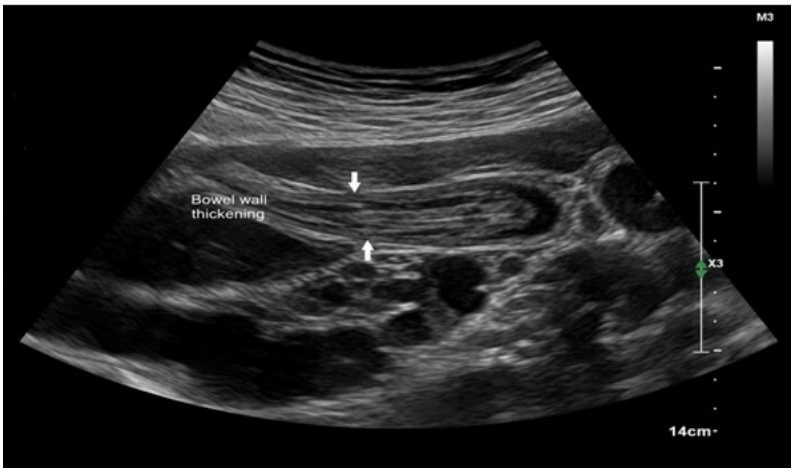

Figure 2. Grayscale ultrasound demonstrating bowel wall thickening.

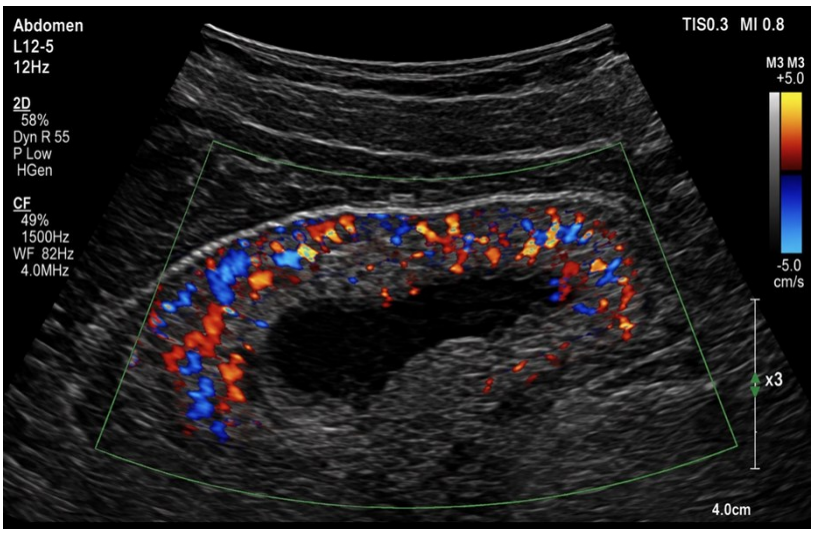

Figure 3. Color Doppler ultrasound showing increased mural vascularity.

Correlation Between Ultrasound Findings and Endoscopic Activity

As shown in Table 4, with the increase of Mayo Endoscopic Score the bowel wall thickness and Doppler vascularity also became significantly higher (Fig. 3).

Table 4. Association between bowel ultrasound findings and Mayo Endoscopic Subscore

Variable	MES 0–1 (n=32)	MES 2–3 (n=58)	P-value
Wall thickness (mm)	3.4 ± 0.6	6.2 ± 1.3	<0.001
Doppler score	1.1 ± 0.5	2.8 ± 0.7	<0.001
Loss of stratification (%)	21.9	67.2	<0.001
Mesenteric fat hypertrophy (%)	18.8	56.9	0.002

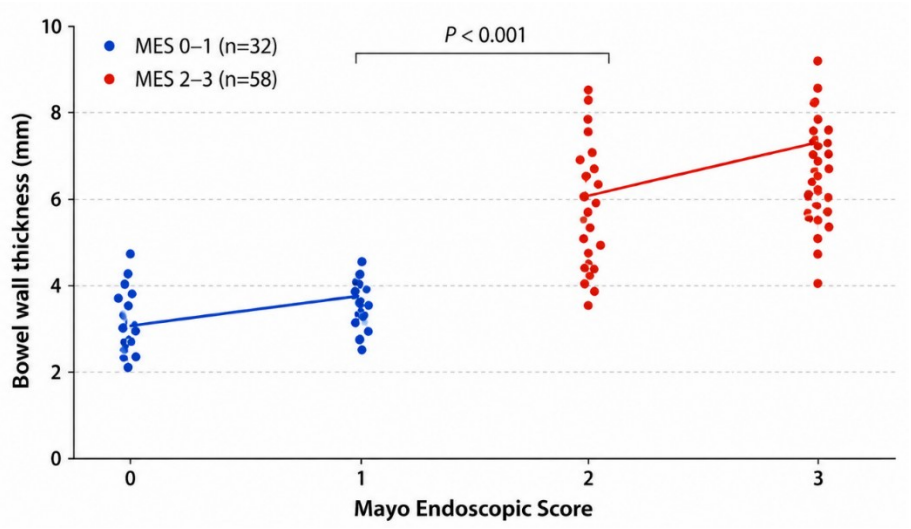

Figure 3. Scatter plot showing the relationship between bowel wall thickness and Mayo Endoscopic Score.

Diagnostic Accuracy of Bowel Ultrasound

Overall, bowel ultrasound is comparable to colonoscopy in terms of its diagnostic precision and is presented as an overview in Table 5 and Fig. 4. For active ulcerative colitis, the sensitivity of ultrasound was excellent and the specificity was good.

Table 5. Diagnostic performance of bowel ultrasound

Parameter	Value (%)
Sensitivity	91.4
Specificity	84.4
Positive Predictive Value (PPV)	90.0
Negative Predictive Value (NPV)	86.3
Overall Accuracy	88.9
AUC (95% CI)	0.93 (0.88–0.98)

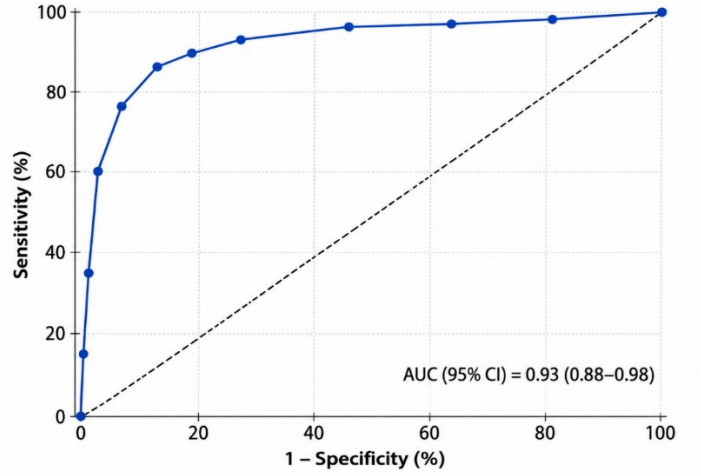

Figure 4. Receiver operating characteristic (ROC) curve for bowel ultrasound.

Agreement Between Ultrasound and Colonoscopy

There are no differences seen between bowel ultrasound and colonoscopy as described in the agreement (Table 6). A good agreement was found between the two modalities.

Table 6. Agreement analysis

Variable	Value
Cohen's Kappa	0.79
Standard Error	0.06
P-value	<0.001

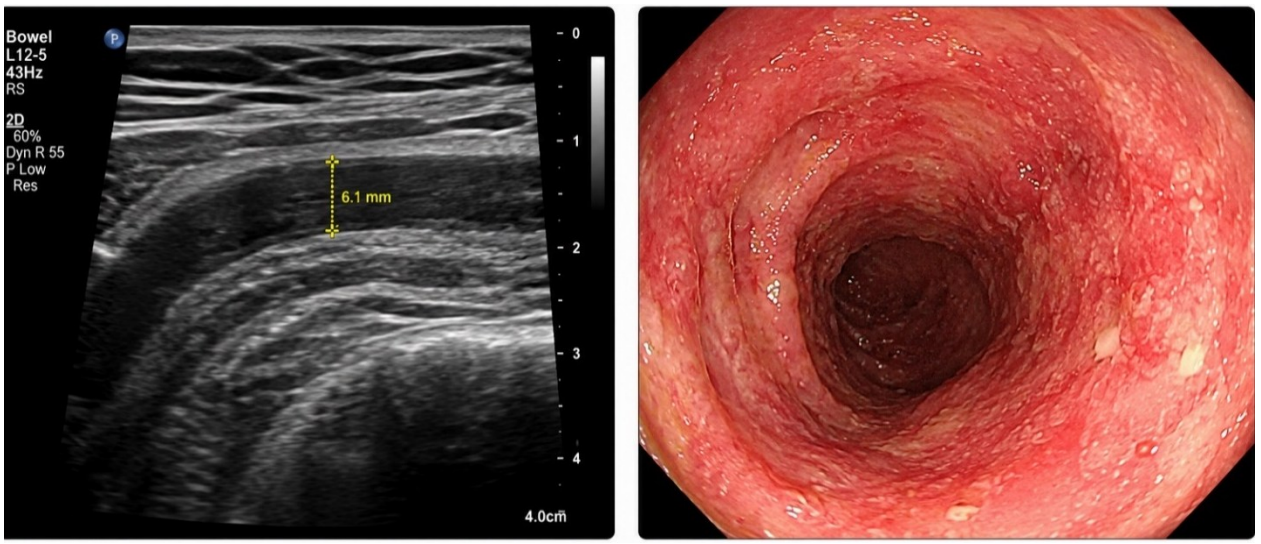

Figure 5. Representative paired bowel ultrasound (Left) and colonoscopy images (Right) from the same patient. Bowel wall thickening (~6 mm) with increased echogenicity on ultrasound corresponding to Mayo endoscopic subscore 2 inflammations on colonoscopy.

Correlation with Laboratory Biomarkers

Table 7 shows the association between bowel ultrasound features and inflammatory markers. There were significant positive correlations between the Mayo Endoscopic Score, bowel wall thickness and Doppler vascularity with CRP and ESR.

Table 7. Correlation between ultrasound findings and laboratory biomarkers

Variable	Wall Thickness (r)	Doppler Score (r)	P-value
CRP	0.69	0.71	<0.001
ESR	0.61	0.64	<0.001
Albumin	-0.48	-0.45	<0.001
Mayo Endoscopic Score	0.82	0.79	<0.001

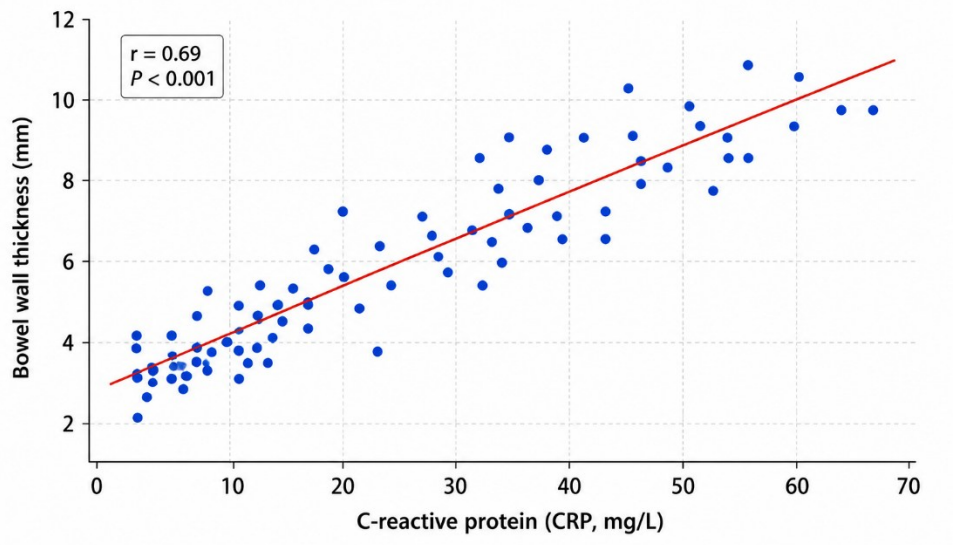

Figure 9. Scatter plot illustrating the positive correlation between bowel wall thickness and C-reactive protein (CRP).

Discussion

The baseline characteristics of the study population showed a mean age of 39.8 ±12.4 years and the result were slightly male predominated (54.4%). In fact, these results are similar to those of some of the epidemiological studies that indicate that UC most often occurs among young and middle-aged adults, and that geographic region and ethnicity had some variability in sex ratio [16]. The relatively high number of findings of active inflammatory changes on colonoscopy and ultrasound provides the explanation that the majority of patients had established disease and not newly diagnosed, since the disease duration was 5.3 years. Other patient characteristics were also similar to those reported in multipurpose cohorts assessed bowel ultrasound in inflammatory bowel disease [17].

Mayo Endoscopic Scores (MES 2–3) accounted for about 2/3 of the population demonstrating their distribution. This finding is similar to that of tertiary referral centres where patients often come in at active disease when there is a need for frequent monitoring [18]. In the present study a slightly higher proportion of patients with high endoscopic activity (severe endoscopic inflammation) was seen, however, compared with Allocca et al., in whom almost one-fifth had severe endoscopic activity. It can be explained by the difference between study populations in either referral patterns, disease duration, treatment status or health care access [19].

The most common sonographic thickening of which bowel wall was noted in the > 70% of patients. This agrees with other studies that found the thickness of the bowel wall to be the most reproducible and clinically useful ultrasound parameter in assessing inflammatory activity in the UC [20,21]. Therefore, increased bowel wall thickness is an objective measurement of active inflammatory disease, due to increased inflammatory infiltration, mucosal edema, vascular congestion and transmural inflammatory extension. While ulcers colitis is, classically, a mucosal disease, a persistent inflammatory status may lead to measurable thickening which is revealed by HRUS.

Likewise, Doppler vascularity was found to be increased in about two-thirds of patients and showed a strong association with endoscopic severity in these patients. Hypervascularity is an increased amount

of angiogenesis and inflammatory hyperemia in the wall of the bowel, and these are typical features of active UC. These results are similar to those of Maaser et al. who also found that color Doppler examination is an independent predictor of endoscopic inflammation [22]. However, several investigators have reported reduced sensitivity of Doppler imaging, particularly when performing imaging in patients receiving corticosteroid or biologic therapy, in which there may be a decrease in vascular signal with continuing mucosal inflammation [23]. These discrepancies are probably attributed to differences in the ultrasound equipment, Doppler setting or operator experience.

There was a significant increase with the higher Mayo scores, especially when loss of bowel wall stratification was assessed. This is in line with the previous finding that the normal stratification of the bowel wall is lost, which was observed by one of the studies, and suggested that it was a sign of more severe inflammatory injury [24]. The present results also showed that the mesenteric fat hypertrophy was significantly more prevalent in the severe disease cases. Even if this attribution of proliferation of mesenteric fat had been more linked to Crohn's disease, recent evidences have shown that also CA-ULC can cause secondary inflammatory events in surrounding tissue, that is mesenteric fat [25]. Hence, this feature is of particular importance to be taken into account when evaluating ultrasound.

The most significant of these results was the extremely close relationship between Bowel US parameter and Mayo Endoscopic Score. Patients having an active endoscopic disease had significantly higher Doppler scores, bowel wall thickness, and a higher frequency of loss of stratification, as compared to mild disease and patients in a remission state. The results of this study were also in correlation with those of the International Bowel Ultrasound Group (IBUS) that proposed that bowel wall thickness and vascularity are the most critical signs Sonographically suggestive of inflammatory activity [26]. Similarly, Novak et al. found a high correlation between the thickness of the bowel wall and endoscopic severity (correlation coefficients similar to the study of the present investigation) [21].

The diagnostic accuracy analysis also showed that bowel ultrasound was a very good test, with a good positive predictive value of 91.4%, a good negative predictive value of 84.4% and an AUC of 0.93. This is a very similar sensitivity and specificity to those noted by Allocca et al., who determined the bowel ultrasound to be highly sensitive and specific for the detection of active ulcerative colitis (sensitivity and specificity both >85%) [19]. Similar, Calabrese et al. determined that intestinal ultrasound can also correctly distinguish between active and inactive disease and can be used as an effective marker for treatment response [17]. Comparisons of the studies may lead to slight variation due to differences in operator experience, clinical condition of patients, patient preparation, and ultrasound technique.

The good agreement between bowel ultrasound and colonoscopy (Cohen's $\kappa = 0.79$) show that the bowel ultrasound is a valid instrument, providing similar information to the endoscopic evaluation. Agreements comparable to the aforementioned are given where bowel ultrasound is used as an alternative monitoring method during regular follow-up [27]. Colonoscopy is, however, still essential for histology, follow-up for dysplasia and biopsy collection. Bowel ultrasound should thus be considered as complementary and not as a substitute for endoscopy.

High positive correlations were found for the bowel wall thickness with Doppler vascularity, inflammatory markers (CRP and ESR) and with Mayo Endoscopic Score (MES) whereas serum albumin showed an inversely significant correlation. These results are biologically plausible, as increased inflammatory activity leads to the increase in acute-phase reactants, and the decreased production of albumin, due to the effects of systemic inflammation and protein loss. The same associations have been previously confirmed in other research studies that assessed intestinal US in inflammatory bowel diseases [28,29]. Interestingly, it has been reported that the relationship between ultrasound results and CRP, especially when isolated distal colitis occurs, may be weaker because a systemic inflammatory response may be relatively less severe despite important local lesions [30]. This can be why there are inconsistencies that vary between these studies.

Together, the conditions detailed herein underscore the increasing body of evidence favoring bowel ultrasound for the accurate use of a radiation-free, patient-friendly and easy to reach imaging technique to assess ulcerative colitis. It is unique because it allows the appreciation of active inflammation, is highly correlated with the endoscopic severity and with the follow-up of inflammatory disease and hence represents outstanding value in routine clinical practice. The use of bowel ultrasound alongside routine clinical management of a patient's UC diagnosis and care could support a stepped care approach and

diminish the need for repeat invasive colonoscopy, allow for earlier therapeutic consideration, enhance patient comfort and provide improved longitudinal disease monitoring.

Conclusion and Recommendations

This research showed that bowel ultrasonography is an extremely promising non-invasive imaging tool which can be used to help assess the activity of disease in patients with ulcerative colitis. The role of sonographic parameters, including bowel wall thickness, increased Doppler vascularity and loss of bowel wall stratification correlated well with the Mayo endoscopy score as well as inflammatory biomarkers, supporting them as reliable markers of active intestinal inflammation. Bowel ultrasound was also highly sensitive, specific, and had good agreement with colonoscopy to identify active disease, and so was considered to be a very useful tool for reaching the correct diagnosis. The results are important in highlighting the possible role of bowel ultrasound as a clinical tool to monitor and follow-up disease, decrease repeated invasive endoscopy, and assess responses to treatment. Bowel ultrasonography is a rapid, safe, radiation free and patient-friendly assessment technique which is a copper plate tool for mucosal assessment and histopathological evaluation. Bowel ultrasound use in routine clinical practice could help better monitor the disease, guide timely treatment and management, improve patient comfort and facilitate holistic management of UC.

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