

# Prospective Evaluation Of Mr Enterography And Diffusion- Weighted Imaging For Predicting Crohn's Disease Activity Assessed By The Simple Endoscopic Score.

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## ABSTRACT

**Background:** Accurate assessment of Crohn's disease (CD) activity is critical for guiding therapy and monitoring response, with mucosal healing increasingly recognised as a key treatment target. Colonoscopy with the Simple Endoscopic Score for Crohn's Disease (SES-CD) is the reference standard but is invasive and unsuitable for frequent repetition. Magnetic resonance enterography (MRE), particularly with diffusion-weighted imaging (DWI) and apparent diffusion coefficient (ADC) quantification, may offer a non-invasive surrogate of endoscopic activity.

**Methods:** In this prospective cross-sectional single-centre study, 54 adults (age  $39.1 \pm 9.3$  years) with histologically proven ileocolic CD underwent ileocolonoscopy and 3.0-T MRE including DWI between August 2023 and February 2025. SES-CD defined four activity grades and patients were dichotomised into Group 1 (inactive/mild, SES-CD <7; n = 26) and Group 2 (moderate/severe, SES-CD  $\geq 7$ ; n = 28). Conventional MRE variables (bowel wall thickness, mural T2 hyperintensity, contrast enhancement) and DWI-based metrics (visual DWI score, ADC) were scored by two blinded radiologists. Clinical indices (CDAI, C-reactive protein [CRP]) were recorded. Group comparisons used t-tests and  $\chi^2$  tests. Receiver operating characteristic (ROC) analysis was performed for ADC and other imaging parameters against SES-CD. Results: Compared with Group 1, Group 2 patients were more often female (89.3% vs 23.1%), had longer disease duration ( $7.4 \pm 2.0$  vs  $4.0 \pm 2.1$  years) and longer involved bowel segments

( $20.4 \pm 4.4$  vs  $5.2 \pm 1.9$  cm;  $p < 0.001$ ). CDAI and CRP were significantly higher in Group 2. Mural T2 hyperintensity and DWI grades were significantly increased in Group 2, whereas wall thickness and contrast enhancement did not differ significantly. Mean ADC values were lower in Group 2 ( $1.3 \pm 0.2$  vs  $1.9 \pm 0.4 \times 10^{-3}$  mm<sup>2</sup>/s;  $p < 0.001$ ). ADC showed excellent discrimination for moderate/severe disease (AUC 0.90; 95% CI 0.81–0.99); an optimal cut-off of  $\leq 1.45 \times 10^{-3}$  mm<sup>2</sup>/s yielded high sensitivity and diagnostic accuracy for predicting SES-CD  $\geq 7$ .

**Conclusion:** MRE with DWI, particularly quantitative ADC, reliably differentiates inactive/mild from moderate/severe ileocolic CD as defined by SES-CD. ADC appears to outperform conventional MRE variables and may serve as a robust, non-invasive biomarker for disease activity stratification and monitoring.

**Keywords:** Crohn's disease; MR enterography; diffusion-weighted imaging; apparent diffusion coefficient; Simple Endoscopic Score for Crohn's Disease; disease activity.

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## INTRODUCTION

Crohn's disease (CD) is a chronic relapsing inflammatory bowel disease characterised by transmural inflammation,

bowel damage and progressive disability. Contemporary therapeutic strategies emphasise tight control of inflammation and achievement of mucosal healing, as these

endpoints are associated with fewer hospitalisations, surgeries and complications.[1–3]

Endoscopy remains the reference standard for assessing luminal disease activity. The Simple Endoscopic Score for Crohn's Disease (SES-CD) was specifically developed to provide a reproducible, easy-to-use index derived from ulcer size, ulcerated surface, affected surface and luminal narrowing across ileocolonic segments.[1] It correlates well with more complex indices and with the Crohn's Disease Activity Index (CDAI), and demonstrates good responsiveness to change.[2,3] Despite this, colonoscopy is invasive, requires bowel preparation and sedation, may be limited by strictures, and cannot fully assess transmural or extra-luminal disease.

Magnetic resonance enterography (MRE) has emerged as a key non-invasive, radiation-free modality for CD, allowing evaluation of mural inflammation, strictures, fistulae and penetrating complications in a single examination.[4–6] Several MRE-based activity indices (e.g. MaRIA, simplified MaRIA, and other composite scores) incorporate bowel wall thickening, mural T2 hyperintensity (oedema), ulceration and contrast enhancement, and show strong correlations with endoscopic activity. However, such indices can be time-consuming, and the need for gadolinium contrast is increasingly questioned.

Diffusion-weighted imaging (DWI) complements conventional MRE by probing the random motion of water molecules in tissues. Active inflammation, with cellular infiltration and interstitial oedema, restricts diffusion and appears as high DWI signal with reduced apparent diffusion

coefficient (ADC). Multiple studies and meta-analyses have shown that DWI improves detection of active intestinal inflammation and can differentiate active from quiescent disease, sometimes with diagnostic performance comparable to contrast-enhanced sequences.[5–7] Moreover, prospective studies suggest that DWI-only or non-contrast MRE protocols may be non-inferior to standard contrast-enhanced MRE for evaluating small-bowel CD.[7]

Soydan et al. demonstrated, in a retrospective cohort of 54 patients, that DWI scores, mural T2 hyperintensity and ADC values can distinguish moderate/severe CD from inactive/mild disease defined by SES-CD, although their reported diagnostic accuracy for ADC was only moderate.[8] Since most available data originate from Western cohorts and retrospective designs, further prospective validation, especially in different populations and practice settings, is warranted.

The **primary aim** of the present study was to evaluate the ability of conventional MRE features and DWI (including ADC) to differentiate inactive/mild from moderate/severe ileocolic CD activity, using SES-CD as the reference standard, in a prospective Indian cohort. The secondary aims were (i) to determine an optimal ADC cut-off value for predicting moderate/severe disease, and (ii) to compare the diagnostic performance of ADC with conventional MRE metrics and combined DWI/T2-based scores.

## MATERIALS AND METHODS

This prospective cross-sectional study was conducted in the Department of Radiodiagnosis at Chettinad Hospital and Research Institute (CHRI), Chennai, India, over a period of 18 months from August 2023 to February 2025. Adult patients with previously diagnosed Crohn's disease (CD) who were referred for evaluation of disease activity were consecutively screened for eligibility. Ethical approval was obtained from the institutional ethics committee, and written informed consent was secured from all participants in their native language in accordance with the principles outlined in the Declaration of Helsinki.

Eligible participants included individuals aged between 30 and 70 years with histologically confirmed Crohn's disease who presented with abdominal symptoms necessitating both imaging and endoscopic evaluation. Only those patients who had undergone both ileocolonoscopy and magnetic resonance enterography (MRE), including diffusion-weighted imaging (DWI), were included. Additionally, patients were required to have no initiation or modification of CD-specific therapy in the interval between colonoscopy and MRE. Patients were excluded if they had suspected but unconfirmed CD, prior bowel resection for Crohn's disease, acute abdomen or requirement for emergency surgery, major coexisting systemic illness, pregnancy, contraindications to MRI or gadolinium-based contrast agents, or if they declined participation. A total of 54 patients met the inclusion criteria and constituted the final study cohort. The mean interval between ileocolonoscopy and MRE was  $20.9 \pm 11.7$  days, during which no disease-modifying therapy was initiated or altered.

Ileocolonoscopy was performed by two experienced gastroenterologists using standard high-definition videoendoscopes (Olympus Evis Exera II and Fujinon VP-4450 HD systems). The examination extended from the rectum to the terminal ileum in all cases. The bowel was systematically divided into five anatomical segments: terminal ileum, right colon, transverse colon, left colon, and rectum. Disease severity was assessed using the Simple Endoscopic Score for Crohn's Disease (SES-CD), wherein four parameters—ulcer size, ulcerated surface, affected surface, and luminal narrowing—were graded on a scale from 0 to 3 for each segment. These scores were summed to obtain a segmental score (range 0–12), and the total SES-CD score (range 0–56) was calculated by aggregating scores across all segments. Based on established thresholds, disease activity was categorized as inactive (0–2), mild (3–6), moderate (7–15), or severe ( $>15$ ) [1,2]. For analytical purposes, patients were further dichotomized into two groups: Group 1 comprising inactive to mild disease (SES-CD  $<7$ ;  $n = 26$ ) and Group 2 comprising moderate to severe disease (SES-CD  $\geq 7$ ;  $n = 28$ ).

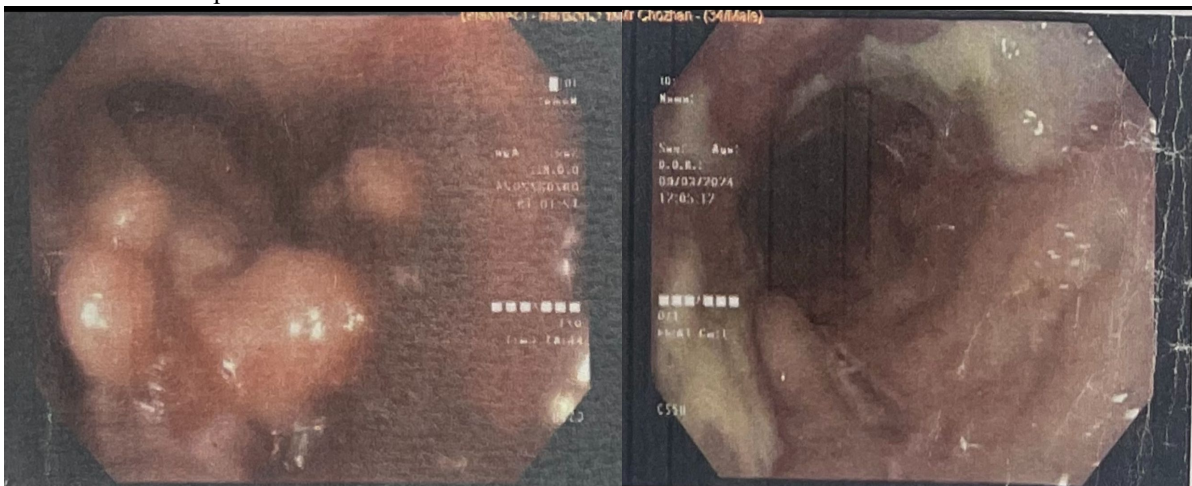
All patients underwent MRE following a standardized preparation protocol. Participants adhered to a low-residue diet for five days prior to imaging and fasted overnight. Bowel distension was achieved through administration of 1200–1500 mL of 3% mannitol solution over approximately 50 minutes. To reduce bowel peristalsis, 0.5 mg of intramuscular glucagon was administered 30 minutes

before imaging. Imaging was performed using a 3.0-T Philips Ingenia MRI scanner equipped with a phased-array abdominal coil. The imaging protocol included axial and coronal T2-weighted single-shot fast spin-echo sequences, fat-suppressed T2-weighted sequences, and axial and coronal T1-weighted gradient-echo sequences obtained before and after intravenous contrast administration. Diffusion-weighted imaging was performed using echo-planar sequences with b values of 0 and 800 s/mm<sup>2</sup>. A gadolinium-based contrast agent was administered intravenously at a dose of 0.1 mmol/kg, and post-contrast images were acquired after a delay of approximately 70 seconds. Late-phase imaging was not included in the protocol.

Image analysis was conducted on a dedicated workstation (AW 4.6 Functool, GE Healthcare) by two experienced abdominal radiologists who were blinded to clinical and endoscopic findings. To ensure unbiased evaluation, diffusion-weighted images were analyzed prior to reviewing conventional MRE sequences. For each patient, both ileal and colonic segments were assessed; however, quantitative analysis was focused on the segment demonstrating the most severe disease involvement. This segment was identified based on the presence of maximal bowel wall

thickening, pronounced T2 hyperintensity, strongest contrast enhancement, and highest signal intensity on DWI. Semi-quantitative assessment of MRE findings was performed using standardized scoring criteria. Bowel wall thickness was graded as mild (0–4 mm), moderate (5–7 mm), or marked (>7 mm). Mural T2 hyperintensity, reflecting bowel wall oedema, was evaluated relative to the signal intensity of the psoas muscle and graded as mild (dark grey), moderate (light grey), or marked (grey-white). Contrast enhancement patterns were also graded semi-quantitatively as mild when predominantly mucosal, moderate when transmural, and marked when transmural with serosal involvement and a layered enhancement pattern. These imaging parameters were used to assess disease severity and were subsequently correlated with endoscopic findings.

ADC maps were generated from b=0 and b=800 s/mm<sup>2</sup> images. Three circular regions of interest were drawn on the most abnormal portion of the bowel wall, avoiding lumen and perienteric fat. Mean ADC for each segment was calculated and expressed as  $\times 10^{-3}$  mm<sup>2</sup>/s. Inter-observer variability for MRE and DWI parameters was assessed using kappa statistics and intraclass correlation coefficients.



Sigmoidoscopy of patients exhibiting polypoidal lesions which further on HPE showed :

**Moderate Chronic crypt Destructive Proctocolitis with activity , ulceration.**

#### Clinical and laboratory data

Demographic and clinical data included age, sex, disease duration, segment length (cm), disease location (ileal, colonic, ileocolonic), Montreal behaviour (non-stricturing/non-penetrating, stricturing, penetrating), CDAI, prior medication use, and serum CRP levels (mg/dL). CDAI scores

were categorised as remission (<150), mild (150–219), moderate (220–450) and severe (>450).

Statistical analysis

Data were analysed using SPSS version 25 (IBM Corp.). Continuous variables are reported as mean  $\pm$  SD or median (range), categorical variables as counts and percentages. Group comparisons used the independent-samples t-test or ANOVA for continuous variables and  $\chi^2$  or Fisher's exact tests for categorical variables. ROC curves and areas under the curve (AUCs) with 95% confidence intervals (CIs) were calculated for ADC, DWI scores, mural T2 hyperintensity, and combined DWI+T2 scores to predict SES-CD  $\geq 7$ . Optimal cut-off values were chosen using the Youden index. A p-value <0.05 was considered statistically significant

**RESULTS**

Baseline clinical characteristics

Fifty-four patients were included (mean age  $39.1 \pm 9.3$  years; range 30–55), with a female predominance (57.4%). Mean disease duration was  $5.8 \pm 2.7$  years, and the mean length of the diseased segment on MRE was  $13.0 \pm 8.4$  cm. Ileocolonic involvement was most common (44.4%), followed by isolated colonic (31.5%) and isolated ileal disease (24.1%). Nearly half of patients (48.1%) exhibited

non-stricturing, non-penetrating behaviour, 31.5% penetrating, and 20.4% stricturing. Mean CDAI was  $199.8 \pm 88.7$ , mean CRP  $27.8 \pm 26.3$  mg/dL, and mean SES-CD  $9.4 \pm 6.7$ . On SES-CD, 22.2% of patients were inactive, 25.9% mild, 27.8% moderate and 24.1% severe. For further analysis, these were collapsed into Group 1 (inactive/mild,  $n = 26$ ) and Group 2 (moderate/severe,  $n = 28$ ).

**Table 1. Baseline Characteristics Of The Study Population By Ses-cd Group**

Variable	Total (n=54)	Group 1 (SES-CD <7, n=26)	Group 2 (SES-CD ≥7, n=28)	p-value
Age, years, mean ± SD	$39.1 \pm 9.3$	$38.2 \pm 9.1$	$40.4 \pm 9.5$	0.74
Female sex, n (%)	31 (57.4)	6 (23.1)	25 (89.3)	<0.001
Disease duration, years, mean ± SD	$5.8 \pm 2.7$	$4.0 \pm 2.1$	$7.4 \pm 2.0$	0.93
Segment length, cm, mean ± SD	$13.0 \pm 8.4$	$5.2 \pm 1.9$	$20.4 \pm 4.4$	<0.001
Location ileal, n (%)	13 (24.1)	3 (11.5)	10 (35.7)	
Location colonic, n (%)	17 (31.5)	9 (34.6)	8 (28.6)	0.11
Ileocolonic, n (%)	24 (44.4)	14 (53.8)	10 (35.7)	
Non-stricturing/non-penetrating, n (%)	26 (48.1)	26 (100)	0 (0)	<0.001
Stricturing, n (%)	11 (20.4)	0 (0)	11 (39.3)	
Penetrating, n (%)	17 (31.5)	0 (0)	17 (60.7)	
CDAI, mean ± SD	$199.8 \pm 88.7$	$135.6 \pm 35.5$	$259.4 \pm 81.4$	<0.001
CRP, mg/dL, mean ± SD	$27.8 \pm 26.3$	$4.1 \pm 2.3$	$49.9 \pm 17.4$	<0.001

Patients with moderate/severe disease (Group 2) displayed a more aggressive phenotype, characterised by female predominance, longer disease duration, markedly longer involved segments, and a shift from purely inflammatory to stricturing and penetrating behaviour. CDAI and CRP were substantially higher in Group 2, confirming that SES-CD categories aligned with systemic measures of activity. These findings support the construct validity of SES-CD in this cohort and provide a robust clinical framework for evaluating imaging biomarkers.

Conventional MRE and DWI findings in the whole cohort On conventional MRE, wall thickness was mild in 22.2%, moderate in 46.3% and marked in 31.5% of patients. Mural T2 hyperintensity grades were mild in 35.2%, moderate in 42.6% and marked

in 22.2%. More than half of patients (53.7%) showed marked combined transmural and serosal contrast enhancement, while 38.9% had moderate and 7.4% mild enhancement.

DWI signal was graded mild in 13.0%, moderate in 51.9% and marked in 35.2%. The mean DWI score across the cohort was  $1.8 \pm 0.6$ . Mean ADC was  $1.6 \pm 0.4 \times 10^{-3}$  mm<sup>2</sup>/s (range 0.5–2.5), with a median of  $1.5 \times 10^{-3}$  mm<sup>2</sup>/s.

Relationship between MRE/DWI parameters and SES-CD

**Table 2. Comparison of MRE and DWI parameters between SES-CD groups**

Parameter	Group 1 (n=26)	Group 2 (n=28)	p-value
Wall thickness grade 1/2/3, n (%)	8 / 12 / 6 (30.8/46.2/23.1)	4 / 13 / 11 (14.3/46.4/39.3)	0.25
Mural T2 hyperintensity (mean ± SD)	1.5 ± 0.7	2.1 ± 0.7	0.001
T2 grade mild/mod/marked, n (%)	17/6/3	5/14/9	0.002
Contrast enhancement mild/mod/marked, n (%)	2/11/13	2/10/16	0.87
DWI grade mild/mod/marked, n (%)	6/14/6	1/14/13	0.05
DWI+T2 sum score, mean ± SD (2–6)	3.5 ± 1.3	4.6 ± 1.2	0.002
ADC ( $\times 10^{-3}$ mm <sup>2</sup> /s), mean ± SD	1.9 ± 0.4	1.3 ± 0.2	<0.001

Mural T2 hyperintensity and DWI-related parameters showed clear separation between inactive/mild and moderate/severe SES-CD groups, while wall thickness and contrast enhancement alone did not. The composite DWI+T2 score increased significantly with endoscopic severity, reflecting greater mural oedema and diffusion restriction. ADC values were markedly lower in moderate/severe disease, consistent with restricted diffusion in inflamed bowel. These findings underscore the value of functional MR parameters, particularly DWI and ADC, for grading Crohn's disease activity.

Diagnostic performance of imaging parameters

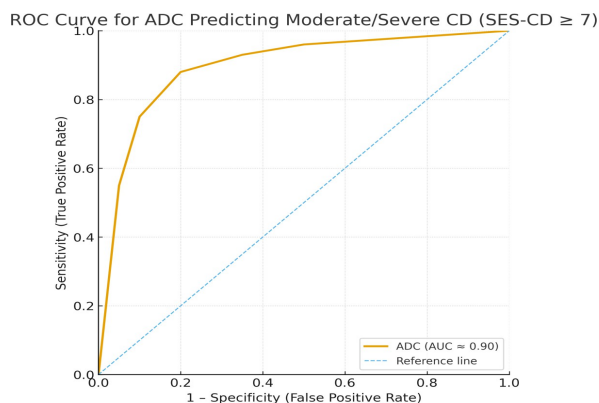
ROC analysis demonstrated that ADC was the most powerful imaging biomarker for predicting moderate/severe disease (SES-CD  $\geq 7$ ). An ADC threshold of  $\leq 1.45 \times 10^{-3}$  mm<sup>2</sup>/s achieved an AUC of 0.90 (95% CI 0.81–0.99; p<0.001), with high sensitivity and overall diagnostic accuracy for identifying Group 2 patients. DWI grade and the combined DWI+T2 score also showed good discrimination, though with slightly lower AUCs than ADC. Wall thickness and contrast enhancement contributed less to classification performance.

**Table 3. ROC analysis for imaging parameters predicting SES-CD  $\geq 7$**

Parameter	Optimal cut-off	AUC (95% CI)	p-value	Key performance summary*
ADC ( $\times 10^{-3}$ mm <sup>2</sup> /s)	$\leq 1.45$	0.90 (0.81–0.99)	<0.001	High sensitivity and accuracy
DWI grade	>2	0.79 (0.67–0.91)	<0.01	Good sensitivity, moderate PPV
DWI+T2 sum score	>3	0.82 (0.71–0.93)	<0.01	Balanced sensitivity/specificity
Mural T2 hyperintensity	$\geq 2$	0.78 (0.65–0.90)	<0.01	Good sensitivity, limited NPV

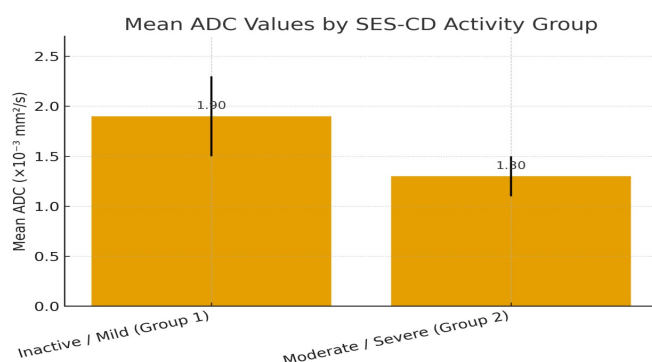
Quantitative ADC measurement provided the best overall discrimination between inactive/mild and moderate/severe disease, outperforming visual DWI grades and conventional MRE variables. The relatively high AUC and favourable sensitivity profile suggest that ADC may serve as a reliable, reproducible biomarker for activity stratification. DWI and combined DWI+T2 scores further enhance classification, supporting a multiparametric approach in practice, whereas reliance on wall thickness and enhancement alone appears suboptimal for precise grading

**Figures**



**FIGURE 1. FLOW DIAGRAM OF PATIENT INCLUSION AND SES-CD-BASED GROUPING**

The flow diagram highlights a clearly defined, prospectively assembled cohort, with exclusions restricted mainly to surgical and incomplete cases, thereby limiting selection bias. The near-equal distribution between inactive/mild and moderate/severe groups ensured adequate statistical power to examine imaging correlates across the full spectrum of endoscopic activity. This balanced design strengthens the internal validity of subsequent ROC analyses comparing MRE and DWI metrics with SES-CD



**FIGURE 2. ROC CURVE OF ADC FOR PREDICTION OF MODERATE/SEVERE**

**CROHN'S DISEASE (SES-CD ≥7)**

The ROC curve demonstrates a steep rise and proximity to the upper left corner, reflecting excellent discriminative performance of ADC. The chosen cut-off of  $\leq 1.45 \times 10^{-3} \text{ mm}^2/\text{s}$  provides a clinically useful balance of sensitivity and overall accuracy for detecting moderate/severe endoscopic activity. This supports the use of quantitative diffusion metrics as a practical, non-invasive surrogate for SES-CD in routine monitoring, particularly when endoscopy is contraindicated or cannot be repeated frequently

**DISCUSSION**

In this prospective single-centre study, we found that MRE combined with DWI, particularly quantitative ADC measurements, reliably differentiated inactive/mild from moderate/severe ileocolic Crohn's disease when using SES-CD as the reference standard. Patients with higher SES-CD scores had longer disease duration, more extensive bowel

involvement, and a shift towards stricturing and penetrating behaviour, along with elevated CDAI and CRP, underscoring the clinical relevance of the endoscopic classification.

Among imaging variables, mural T2 hyperintensity, DWI grade, the composite DWI+T2 score and ADC all correlated with SES-CD, while wall thickness and contrast enhancement alone did not significantly discriminate between activity groups. ADC values were substantially lower in moderate/severe CD, consistent with restricted diffusion in inflamed, cell-rich bowel wall, and an ADC cut-off of  $\leq 1.45 \times 10^{-3} \text{ mm}^2/\text{s}$  yielded excellent diagnostic performance. These findings are concordant with prior work demonstrating that DWI and ADC can reflect inflammatory activity in CD and provide robust quantitative markers.[5-7,9,10]

Our results closely mirror those of Soydan et al., who evaluated 54 patients and reported higher mural T2 and DWI scores and lower ADC values in moderate/severe disease defined by SES-CD.[8] They identified an ADC cut-off of approximately  $1.47 \times 10^{-3} \text{ mm}^2/\text{s}$  with moderate diagnostic accuracy. Differences in AUC between their series and ours may relate to prospective design, population characteristics, distribution of disease severity, and methodological variation in ROI placement. Nonetheless, both studies support ADC as a practical threshold-based biomarker to stratify disease activity

Multiple studies and meta-analyses have confirmed that DWI improves detection of active ileocolonic inflammation and correlates with endoscopic or histopathological reference standards.[5,9-11] Hordonneau et al. validated a quantitative DWI index of activity, while Pendse et al. reported good agreement between DWI-based scores, histology and faecal calprotectin.[9,11] Choi et al. showed, in a systematic review, that DWI has high sensitivity for active disease and can reduce the need for contrast injection.[5] Seo et al. further demonstrated that non-contrast DWI-only MRE was non-inferior to contrast-enhanced MRE for evaluating small-bowel inflammation.[7] Our finding that mural T2 hyperintensity and DWI-based scores stratify SES-CD severity is in keeping with these data and adds prospective evidence from a South Asian cohort.

Conventional MRE indices such as MaRIA and sMaRIA, which weigh wall thickness, T2 signal, ulceration and enhancement, have shown strong correlation with SES-CD and are being refined to improve feasibility.[4,12,13] In our series, wall thickness and enhancement alone did not discriminate strongly between SES-CD categories, whereas T2 hyperintensity—which directly reflects mural oedema—did. This aligns with reports that oedema and ulceration are the most informative components of MRE-based activity scores.[4,12] Recent work on simplified scores and multiparametric MRI (including intravoxel incoherent motion and dynamic contrast-enhanced sequences) may further enhance non-invasive activity assessment, but these approaches are not yet widely available.[12-15]

Clinically, our findings support integrating ADC measurement into routine MRE reporting for CD. A simple

numerical threshold offers an attractive decision tool: values below approximately 1.4–

$1.5 \times 10^{-3}$  mm<sup>2</sup>/s suggest moderate/severe activity and may prompt treatment escalation or closer monitoring, whereas higher values are more compatible with inactive or mildly active disease

Combining ADC with qualitative DWI/T2 assessment may further increase confidence, particularly in borderline cases or suboptimal studies.

Several limitations merit consideration. First, this was a single-centre study with a modest sample size, potentially limiting generalisability and precision of cut-off estimates. Second, imaging analysis was performed at the patient level, using the most abnormal segment; segment-wise analysis might have provided a more granular correlation with segmental SES-CD. Third, although the median interval between colonoscopy and MRE was relatively short, dynamic changes in disease activity cannot be completely excluded. Fourth, we did not directly compare ADC-based assessment with established MRE indices such as MaRIA or with faecal calprotectin. Finally, ADC values can be influenced by scanner type, sequence parameters and ROI methodology; standardisation is essential before universal cut-offs can be adopted.

Despite these limitations, the present study adds prospective, real-world evidence that MRE with DWI—especially ADC—provides a reliable, non-invasive surrogate for SES-CD in ileocolic CD. Future multicentre studies using harmonised protocols, segment-level analysis and longitudinal follow-up are warranted to confirm prognostic value and to evaluate how ADC-guided management influences long-term outcomes

## CONCLUSION

In this prospective cohort of adults with ileocolic Crohn's disease, MR enterography incorporating diffusion-weighted imaging demonstrated strong concordance with endoscopic disease activity as measured by the Simple Endoscopic Score for Crohn's Disease. Functional MR parameters—mural T2 hyperintensity, DWI grade and especially quantitative ADC—outperformed conventional wall thickness and contrast enhancement in differentiating inactive/mild from moderate/severe disease. An ADC cut-off around  $1.45 \times 10^{-3}$  mm<sup>2</sup>/s provided excellent discrimination for clinically relevant activity. These findings support the routine use of DWI and ADC measurement in MRE protocols as a practical, non-invasive biomarker of Crohn's disease activity, with potential to reduce dependence on repeated ileocolonoscopy for disease monitoring and treatment optimisation.

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