

# Tracing Transmural Healing in Crohn's Disease with MRI: correlation between MR enterography, laboratory findings and endoscopy

Tina Tumpej, MD<sup>1</sup>, Saša Rudolf Bombek, MD<sup>1</sup>, Dunja Putniković MD<sup>2</sup>, Andreja Ocepek, MD, PhD<sup>3,4</sup>

<sup>1</sup>Department of Radiology, University Medical Centre Maribor, Maribor 2000, Slovenia

<sup>2</sup>Faculty of Medicine, University of Belgrade, Belgrade 11000, Serbia

<sup>3</sup>Department of Gastroenterology, University Division for Internal Medicine, University Medical Centre Maribor, Maribor 2000, Slovenia

<sup>4</sup>Medical Faculty, University of Maribor, Maribor 2000, Slovenia

## Introduction

- Crohn's disease (CD) is a chronic inflammatory condition of the gastrointestinal tract, characterized by a relapsing and remitting course. It is a progressive disorder that leads to cumulative bowel damage and long-term disability.
- Magnetic resonance enterography (MRE) is an important tool for diagnosis and management of patients with CD. Several radiological scoring systems are used to assess CD on MRE, primarily to quantify inflammation, guide treatment and monitor disease. Magnetic Resonance Index of Activity (MaRIA) and its simplified form sMaRIA being the most widely used and validated systems.

## Results

SES-CD and sMaRIA score	Spearman's rho	p value	Interpretation
Total	-0.344	<0.001	Moderate, statistically significant positive correlation
Terminal ileum	-0.4736	<0.001	Moderate, statistically significant positive correlation
Ascending colon	0.1882	0.0621	No statistically significant correlation
Transversal colon	-0.4385	<0.001	Moderate, statistically significant positive correlation
Left colon and sigmoid	-0.4219	<0.001	Moderate, statistically significant positive correlation
Rectum	0.2354	0.01	Weak, statistically significant positive correlation

### Correlation of endoscopic SES-CD score with radiological MRE sMaRIA score

- Strongest segmental correlations in
  - Terminal ileum
  - Transverse colon
  - Left colon/sigmoid colon
- Rectal segment
  - Weak but significant
- Ascending colon
  - Weak, non-significant

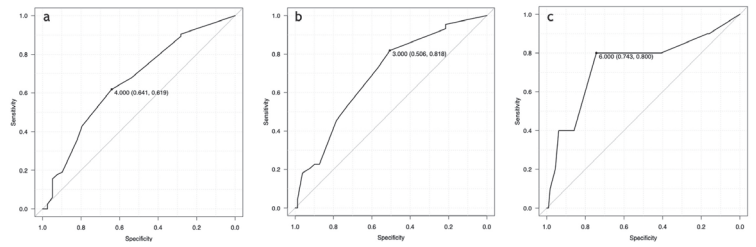
## Study Objectives

To show the degree of correlation between disease activity and disease severity assessed by sMaRIA criteria on MRE and endoscopic findings (SES-CD) in patients with CD at our institution.

To assess the reliability of the sMaRIA criteria by comparing MRE assessments performed independently by an experienced abdominal radiologist and a radiology resident with limited experience.

## Methods

- We retrospectively evaluated 121 patients with a confirmed diagnosis of CD who underwent both MRE and endoscopy at our institution less than six months apart.
- Patients were selected from our institutional database based on the availability of complete clinical, endoscopic, and radiologic records.
- MREs were independently scored by an abdominal radiologist and a radiology resident using the sMaRIA score for each intestinal segment, while endoscopic findings were reviewed and evaluated using the SES-CD.



### sMaRIA score prediction of the activity/severity of disease based on the global SES-CD score - sMaRIA showed:

- substantial discriminative ability to distinguish between active and inactive endoscopic activity
- substantial discriminative ability to distinguish between mild and moderate-to-severe endoscopic activity
- moderate discriminative ability to distinguish between severe and non-severe endoscopic activity

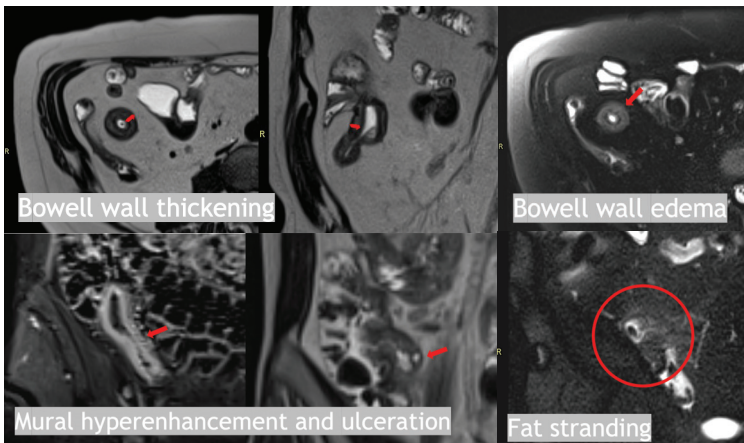
### Interobserver variability of the sMaRIA between a radiology specialist and resident

sMaRIA	Kappa statistics, p<0.001	ICC, p<0.001
	Kappa value	ICC value, 95% CI
Total	K=0.738 Statistically significant almost perfect agreement	0.881 0.817-0.921

Interobserver variability revealed consistently strong agreement between the radiology specialist and the resident across all intestinal segments.

## Signs of disease activity on MRE

Simplified MaRIA (sMaRIA)			
Bowel wall thickness	Bowel wall edema	Fat stranding	Ulcerations



## Conclusion

- With transmural healing being an emerging treatment target in Crohn's disease → greater importance of cross-sectional imaging
- Endoscopy only assesses mucosal healing; MRE and intestinal ultrasound capture full bowel wall and complications
- Non-invasive imaging is gaining importance for monitoring deep disease activity
- There's a need for simple, reliable MRE scoring systems like sMaRIA for routine clinical use

Our study demonstrated moderate to substantial sMaRIA ability to accurately predict CD activity using SES-CD as a reference. The interrater reliability between a radiology resident and an expert was excellent, supporting sMaRIA as a suitable clinical practice instrument.