Small Intestinal Contrast Ultrasonography for Stricture Detection in Crohn's Disease - The Swedish Perspective

M. MAKITAN[1,2] , T. RAITH[1], P. GEDEON[1], M. MELANDER[3], H. SABHAN[4,5], G. PETROUSIS[5,7] G. BILICAN[6], J. MARSAL[1,2], SL HAAS[5,7]

[1]SKANE UNIVERSITY HOSPITAL, LUND/MALMÖ; [2]DEPARTMENT OF CLINICAL SCIENCES, LUND, [3]LINKÖPING UNIVERSITY HOSPITAL, LINKÖPING, [4]SAINT GÖRAN HOSPITAL, STOCKHOLM; [5]DEPARTMENT OF MEDICINE SOLNA, KAROLINSKA INSTITUTET, STOCKHOLM; [6]DEPARTMENT OF GASTROENTEROLOGY, FACULTY OF MEDICINE ANKARA, GAZI UNIVERSITY, ANKARA, TURKEY; [7]CENTRE FOR DIGESTIVE HEALTH, DEPARTMENT OF GASTROENTEROLOGY, DERMATOVENEROLOGY AND REMUATOLOGY, KAROLINSKA UNIVERSITY HOSPITAL.

Background

Crohn's disease (CD) is a chronic, relapsing inflammatory disorder associated with a high risk of complications such as strictures and fistulas, affecting approximately 50% of patients during their lifetime.[1] Accurate identification of these complications is critical for timely intervention, but remains a diagnostic challenge.[2] In Sweden, intestinal ultrasound (IUS) has become an increasingly popular diagnostic modality for inflammatory bowel disease (IBD), facilitated by structured educational programmes provided by the IBUS Group and IBUS Nordic.[3] However, Small Intestinal Contrast Ultrasonography (SICUS), which employs oral polyethylene glycol solution (macrogol) to distend small bowel loops and enhance visualisation, has not yet been implemented in Swedish clinical practice.

Material and methods

A comprehensive search of PubMed and Embase was performed to identify relevant studies on SICUS in CD. Moreover, examples of SICUS application in CD patients were analysed.

In the presented cases, SICUS was performed in a fasted state, with 300 mL of macrogol oral solution administered 30 minutes prior to the procedure. The patients were in a supine position. Ultrasound was performed using a 1-6 MHz convex and a 3-8 MHz linear array probe. Images were compared to MR enterography and ileocolonoscopy performed in a time period of 8 weeks.

Results

Two recent systematic reviews and meta-analyses have demonstrated the superior diagnostic accuracy of SICUS in detecting small bowel strictures in CD. Losurdo et al. and Pruijt et al. both reported that SICUS has significantly higher sensitivity compared with IUS for identifying intestinal strictures.[4, 5]

We present two illustrative cases of patients with ileal CD: one with two short strictures and prestenotic dilatation (**Fig. 2A**), and another with a 6 cm long stricture and prestenotic dilatation (**Fig. 2B**). In both cases, strictures were confirmed by MR enterography and ileocolonoscopy. SICUS successfully identified these strictures, providing a detailed visualisation comparable to, and consistent with findings from cross-sectional imageing and endoscopy.

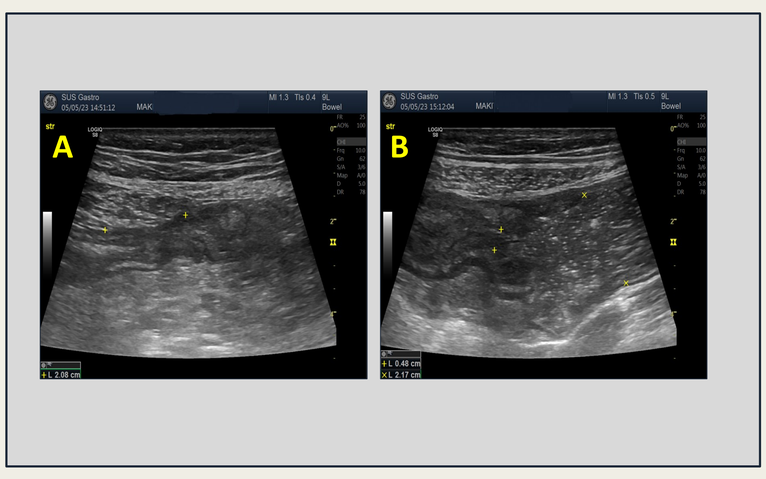

Figure 1. SICUS image of a stricture at anastomosis in one patient with Crohn's disease using the linear array probe.

A. Image taken 10 minutes after macrogol ingestion. Macrogol has not reached the anastomosis.

B. Image taken 30 minutes after ingestion of macrogol, improving the visualisation and revealing the stricture.

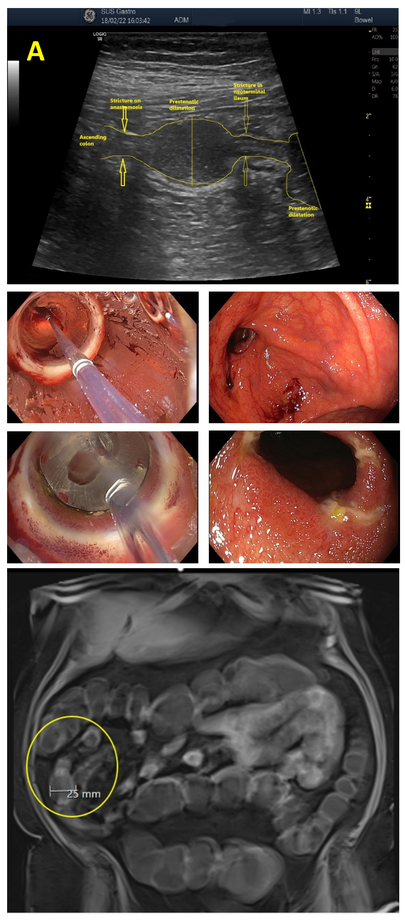

Figure 2 A. SICUS showing two short strictures with prestenotic dilatation. Endoscopy images show balloon dilatation of the stricture at the anastomosis and in the neoterminal ileum. The T1-weighted sequence of MRE image shows these two strictures within the yellow circle.

Figure 2 B. SICUS showing one, 6 cm long stricture, proximal to the ileocecal valve with prestenotic dilatation. Endoscopy images show narrowing of the lumen to about 6 mm. Balloon dilatation of this stricture is not possible. The T1-weighted sequence of MRE image shows the length of the stricture (*), about 6 cm long, and the distance from the ileocecal valve (x), which is about 4 cm.

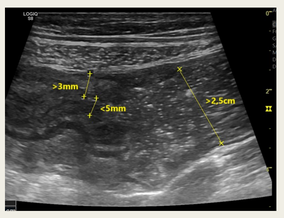

Figure 3. SICUS criteria for Crohn's disease-related bowel strictures are defined by a combination of bowel wall thickness (>3mm), luminal narrowing (<10mm), and prestenotic dilatation (>2,5cm).[6]

Detection of bowel stricture				
	IUS[4]	SICUS[4]	SICUS[3]	MRE[5]
Sensitivity	81%	94%	78%	89%
Specificity	90%	95%	96%	94%
Accuracy	86%	94%		

Table 1. Both Losurdo et al.[3] and Pruijt et al.[4] showed that SICUS has high sensitivity, specificity, and accuracy for the detection of strictures, comparable to IUS and MR enterography.[5]

Conclusion

- **Small Intestinal Contrast Ultrasonography (SICUS) represents a simple yet highly effective diagnostic technique that markedly enhances the accuracy of stricture detection in Crohn's disease.**
- **The growing body of evidence supports its diagnostic value.**
- **These findings highlight the importance of integrating SICUS into clinical practice in Sweden and other Nordic countries to optimise the assessment and management of patients with Crohn's disease.**

References

[1]Torres, J., et al., *Crohn's disease.* Lancet, 2017

[2]Madsen, G.R., et al., *The knowledge and skills needed to perform intestinal ultrasound for inflammatory bowel diseases-an international Delphi consensus survey.* Aliment Pharmacol Ther, 2022

[3]Losurdo, G., et al., *Small Intestinal Contrast Ultrasonography (SICUS) in Crohn's Disease: Systematic Review and Meta-Analysis.* J Clin Med, 2023

[4]Pruijt, M.J., et al., *Diagnostic Accuracy of Intestinal Ultrasound in the Detection of Intra-Abdominal Complications in Crohn's Disease: A Systematic Review and Meta-Analysis.* J Crohns Colitis, 2024.

[5]Panes, J., et al., *Systematic review: the use of ultrasonography, computed tomography and magnetic resonance imaging for the diagnosis, assessment of activity and abdominal complications of Crohn's disease.* Aliment Pharmacol Ther, 2011

[6]Lu, C., et al., *Systematic review: Defining, diagnosing and monitoring small bowel strictures in Crohn's disease on intestinal ultrasound.* Aliment Pharmacol Ther, 2024. **59**(8): p. 928–940

Contact

Mladen Makitan, Department of Gastroenterology, Skane University Hospital, Lund/Malmö, Sweden.
Email: mladen.makitan@med.lu.se