



international bowel
ULTRASOUND GROUP

IUS in UC – State of Evidence in 2026

2026年 IUS 在 UC 中的应用证据

Edmund Wu 胡兆涛

Princess Margaret Hospital, Hong Kong 香港玛嘉烈医院



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The Sixth Affiliated Hospital, Sun Yat-sen University

IUS in UC: From Assessment to Clinical Decision Support

IUS在UC中的应用：从疾病评估到临床决策支持

ESTABLISHED CORE 已确立的作用

- Detecting intestinal inflammation
识别肠道炎症
- Supporting diagnosis
辅助诊断
- Monitoring disease activity
监测疾病活动度



EXPANDING ROLE 不断拓展的临床作用

- Scoring of disease activity 量化疾病活动度
- Early response assessment 早期疗效评估
- Prognosis and risk stratification 预后与风险分层
- Supporting ASUC management 支持急性重症UC管理
- Assessing deeper (transmural) remission 评估更深层缓解（透壁缓解）

Smith RL et al. J Crohns Colitis 2020;14:465–479; Kucharzik T et al. J Crohns Colitis 2025;19:jjaf106; Josefsen S et al. J Clin Med 2026;15:35.

KEY MESSAGE *Detection and monitoring remain fundamental, while IUS is expanding into prognosis and clinical decision support.*
炎症识别与监测仍是基础，IUS正进一步拓展至预后评估与临床决策支持。

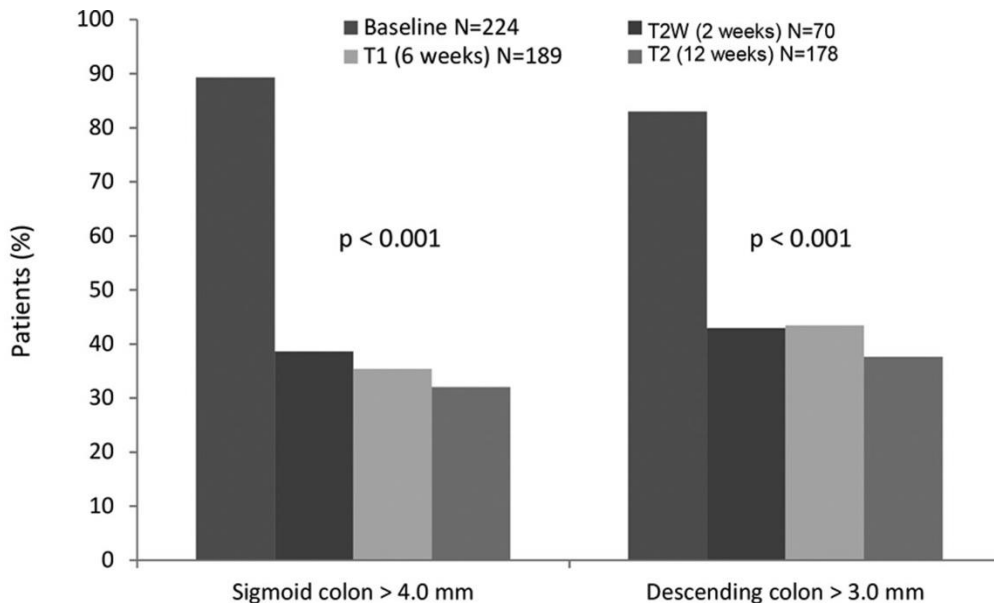
TRUST&UC: the Foundation for Treatment Monitoring

TRUST&UC: UC疗效监测的基础证据

What it showed 主要发现

- 42 German IBD centres
- UC relapse cohort
- IUS at Week 0, 2, 6, 12
- Week 12 normalization correlated with clinical response

Maaser C et al. Gut 2020;69:1629–1636 (TRUST&UC).



KEY MESSAGE TRUST&UC laid the foundation for early, objective IUS response monitoring in UC.

China IUS Standardization - 2024 Chinese Expert Guidance

中国 IUS 规范化

中华超声影像学杂志 2024 年 3 月第 33 卷第 3 期 Chin J Ultrasonogr, March 2024, Vol 33, No. 3

中国炎症性肠病肠道超声检查及报告规范 专家指导意见

中国炎症性肠病诊疗质控评估中心 中华医学会消化病学分会炎症性肠病学组 中华医学会超声分会腹部超声学组

通信作者: 陈旻湖, 中山大学附属第一医院消化内科, 广州 510080, Email: chenminhu@mail.sysu.edu.cn; 谢晓燕, 中山大学附属第一医院超声医学科, 广州 510080, Email: xiexyan@mail.sysu.edu.cn

【摘要】 炎症性肠病 (IBD) 是一种慢性迁延性消化道炎症性疾病, 需长期随访观察。肠道超声 (IUS) 无创、方便、价廉, 是 IBD 长期随访的理想检查手段。本文旨在为我国 IBD 肠道超声规范化检查、超声征象解读以及影像报告书写提供指导意见。

【关键词】 炎症性肠病; 肠道超声; 指导意见

基金项目: 国家重点研发项目资助 (2023YFC2507300); 广东省重点领域研发计划资助 (2023B111040003)

DOI: 10.3760/cma.j.cn131148-20240226-00112

Experts' suggestions on the standardization of intestinal ultrasound examination and reporting for inflammatory bowel disease in China

Chinese Quality Control Assessment Center for IBD Diagnosis and Treatment; Inflammatory Bowel Disease Group, Chinese Society of Gastroenterology; Abdominal Ultrasound Group, Chinese Society of Ultrasound in Medicine

Corresponding author: Chen Minhu, Department of Gastroenterology, the First Affiliated Hospital of Sun Yat-sen University, Guangzhou 510080, China, Email: chenminhu@mail.sysu.edu.cn; Xie Xiaoyan, Department of Medical Ultrasonics, the First Affiliated Hospital of Sun Yat-sen University, Guangzhou 510080, China, Email: xiexyan@mail.sysu.edu.cn

1

Standardized scanning 规范化扫查技术

2

Standardized interpretation 规范化征象解读

3

Structured reporting 结构化报告模板

Developed with key contributions from experts at Sun Yat-sen University, Guangzhou

Chinese IBD Quality Control Center et al. Chin J Ultrasonogr 2024;33(3):185–192.

KEY MESSAGE China is working towards standardized IUS practice.

2025 ECCO-ESGAR-IBUS Guideline: IUS as First-line Imaging

2025国际指南：IUS进入一线评估路径

Diagnosis 初始诊断

Symptoms

症状

Laboratory tests

实验室检查

Ileocolonoscopy + biopsy

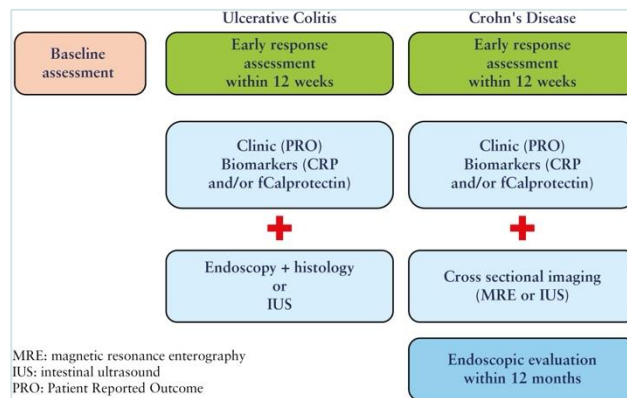
回结肠镜 + 活检

IUS / MRE / both

一线影像评估



Monitoring 治疗监测



Recommendation: IUS is recommended as first-line imaging for both initial diagnosis and treatment monitoring in IBD.

IUS被推荐作为IBD初始诊断及疗效监测的一线影像工具。

Kucharzik T et al. J Crohns Colitis 2025;19:jjaf106

KEY MESSAGE IUS is now embedded in both diagnostic and monitoring pathways.

IUS已融入IBD诊断及疗效监测路径。

Milan Ultrasound Criteria: Linking IUS to Endoscopic Activity

Milan 超声标准：连接IUS与内镜活动度

1

Bowel wall thickness
肠壁厚度 (BWT)

2

Color Doppler signal
彩色多普勒 (CDS)

MUC

$$= 1.4 \times \text{BWT} + 2 \times \text{CDS}$$

Clinical meaning 临床意义

- Simple
- BWT + Doppler
- Predicts endoscopic activity
- Practical point-of-care score

> 6.2

endoscopic activity cut-off

0.911

AUC vs endoscopy

HR 3.87

relapse risk

Allocca M et al. UEGJ 2022;10:190–197; Maeda K/Sagami S et al. Inflamm Intest Dis 2023; Allocca M et al. J Crohns Colitis. 2026;20(Suppl 1):jjaf231.489.

KEY MESSAGE MUC converts BWT and Doppler into a simple quantitative score linked to endoscopic activity.

MUC: From Activity Assessment to Risk Stratification

MUC: 从活动度评估到风险分层

Established role 已确立
的作用

MUC >6.2

Identifies endoscopic activity
识别内镜活动

Beyond current
activity
超越当前活动度



Prognostic extension 预后价值拓展

HR 3.87

MUC >6.2 associated with an
unfavorable disease course
MUC >6.2 与不良疾病进程相关

MUC ≥ 7.7

Higher colectomy risk
结肠切除风险更高

AUROC 0.83

Prediction of colectomy
预测结肠切除

2026 systematic review: BWT remained the strongest individual predictor, while vascularity-based composite scores provided additional prognostic information.

2026年系统综述: BWT仍是最稳定的单项预测指标, 而结合血流信号的综合评分可提供额外的预后信息。

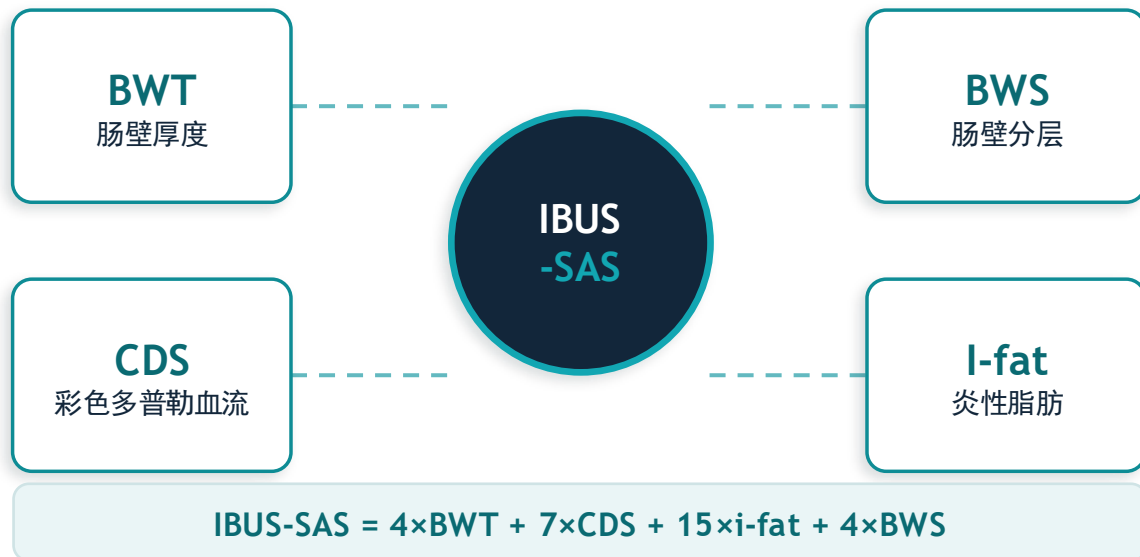
Allocca M et al. UEGJ. 2022;10:190–197; Piazza O Sed N et al. J Crohns Colitis. 2024;18:291–299; Josefsen S et al. J Clin Med. 2026;15:35.

KEY MESSAGE MUC may extend from activity assessment to clinical risk stratification.

MUC的作用可从活动度评估拓展至临床风险分层。

IBUS-SAS: Composite Assessment in UC

IBUS-SAS: UC中的综合超声评估



UC relevance UC中的意义

- Segmental assessment
- Includes wall thickness, vascularity, stratification and inflammatory fat
- Validated against endoscopic activity

Validation in UC 验证

AUROC **0.87-0.89**

Cut-off **>19** (Se 79% · Sp 84%)

p 0.72 with MES & UCEIS

Novak KL et al. J Crohns Colitis. 2021;15:609–616; Fischer S et al. United European Gastroenterol J. 2025;13:1253–1262.

KEY MESSAGE *IBUS-SAS provides a structured composite assessment of UC activity beyond BWT alone.*

Standardized IUS Definitions: Response & Remission

IUS标准化定义：疗效反应与缓解

IUS response

IUS疗效反应

BWT-based response

≥25% BWT reduction from baseline

Multi-parameter response

BWT reduction + ≥1 grade improvement in CDS or another IUS parameter

Score-based response, where MUC is used

MUC reduction ≥2

IUS remission

IUS缓解

BWT ≤3 mm + CDS 0

肠壁厚度 ≤3 mm + 无血流信号

Assess all bowel segments that were abnormal at baseline.

应评估基线时所有受累肠段。

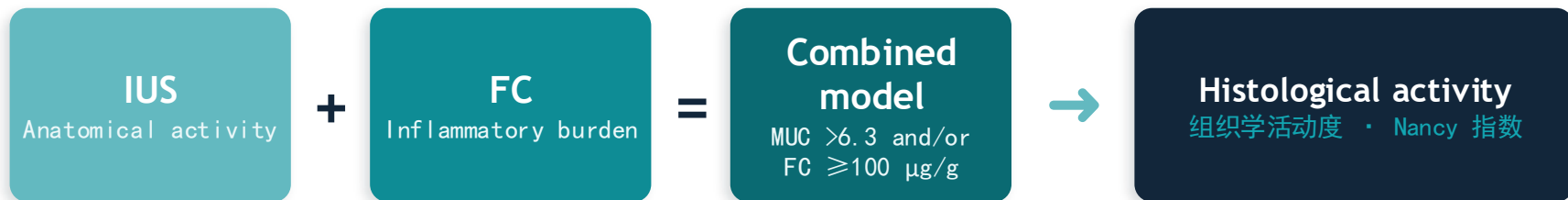
Useful for trials, clinical practice, and longitudinal monitoring.
有助于临床试验、临床实践及长期随访监测。

Ilvemark JFKF et al. J Crohns Colitis. 2022;16:554–580; de Voogd F et al. Gastroenterology. 2022;163:1569–1581; Allocca M et al. J Crohns Colitis. 2025;19:jjaf170;

KEY MESSAGE Consensus definitions support both BWT-based and multi-parameter assessment of IUS response and remission.
共识定义支持基于BWT及多参数的IUS疗效反应与缓解评估。

IUS + FC: Non-invasive Prediction of Histological Activity

IUS + 粪钙卫蛋白：无创预测组织学活动度



88%

Predicted histological activity

88% / 80%

Sensitivity / specificity

95%

Positive predictive value

Outperformed IUS or FC alone · 优于单独IUS或粪钙卫蛋白

Goodsall TM et al. Inflamm Bowel Dis 2024;30:190–195.

KEY MESSAGE Combining IUS with fecal calprotectin may improve non-invasive assessment of microscopic inflammation.
IUS结合粪钙卫蛋白可提升对微观炎症的无创评估。

Drug-specific IUS response kinetics in UC

不同药物的IUS反应动力学



Interpret reassessment timing according to treatment mechanism and baseline disease severity.

复查时间应结合药物作用机制及基线疾病严重程度解读。

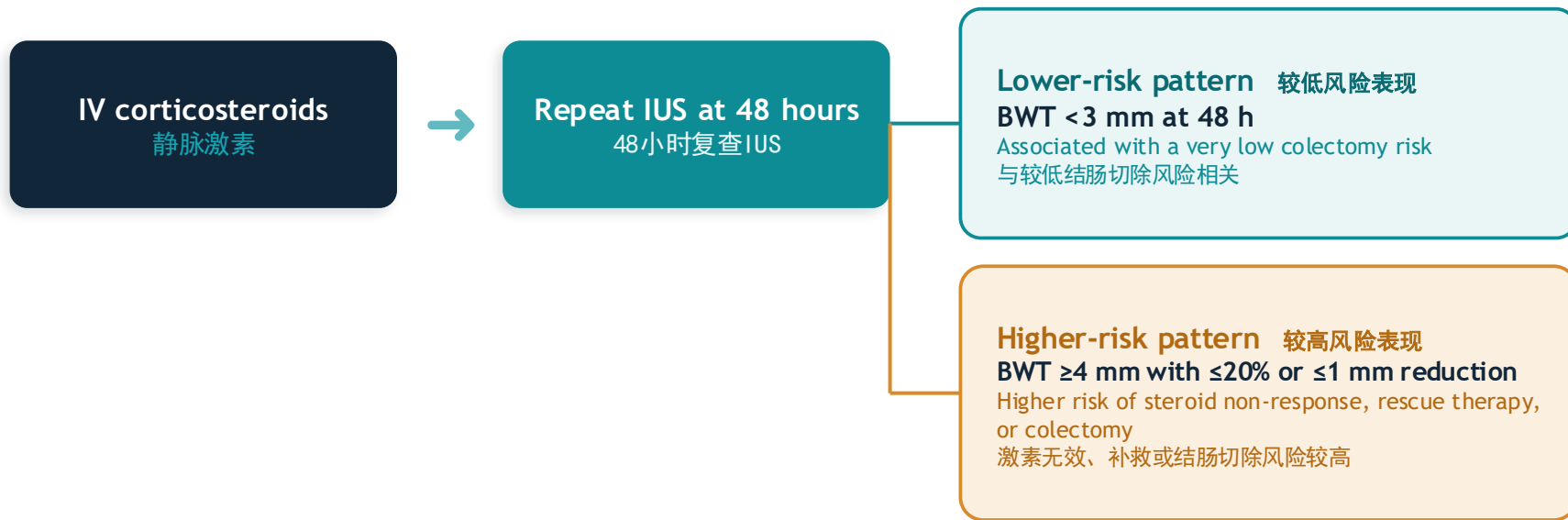
de Voogd FA et al. Inflamm Bowel Dis 2024;30:1992–2003.

KEY MESSAGE *Early IUS response can predict later endoscopic outcomes, but optimal reassessment timing differs by therapy.*

早期IUS反应可预测后续内镜结局，但最佳复查时间因药物而异。

ASUC: 48-hour IUS supports early risk stratification

急性重症UC: 48小时IUS辅助早期风险分层



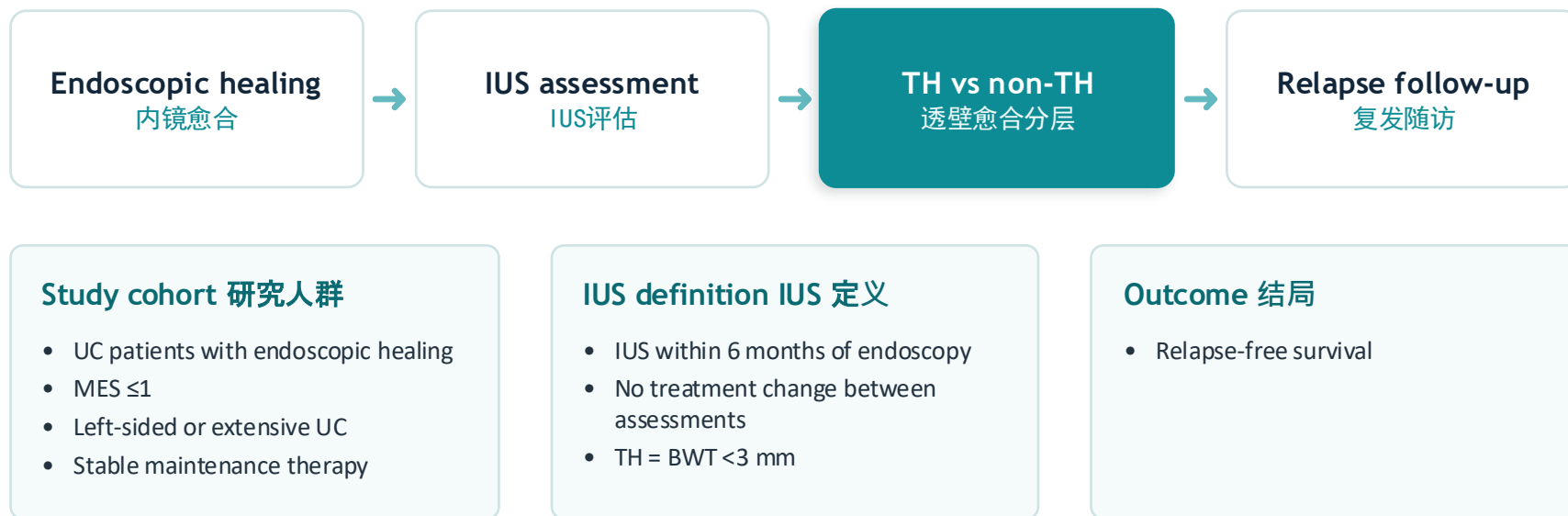
Ilvemark JFKF et al. J Crohns Colitis 2022;16:1725–1734; Ilvemark JFKF et al. JCC 2024;18:1976–1986.

KEY MESSAGE 48-hour IUS may identify steroid non-response early and support timely rescue-therapy decisions.
48小时US可早期识别激素无效，并辅助及时启动补救治疗。

Transmural Healing (TH) beyond Endoscopic Healing (EH)

透壁愈合：超越内镜愈合？

Lim et al., Journal of Crohn's and Colitis 2025



Lim CT et al. J Crohns Colitis 2025;19:jjaf149.

KEY MESSAGE *The study tested whether persistent bowel-wall thickening identifies residual relapse risk after endoscopic healing.*
该研究评估内镜愈合后持续肠壁增厚能否识别残余复发风险。

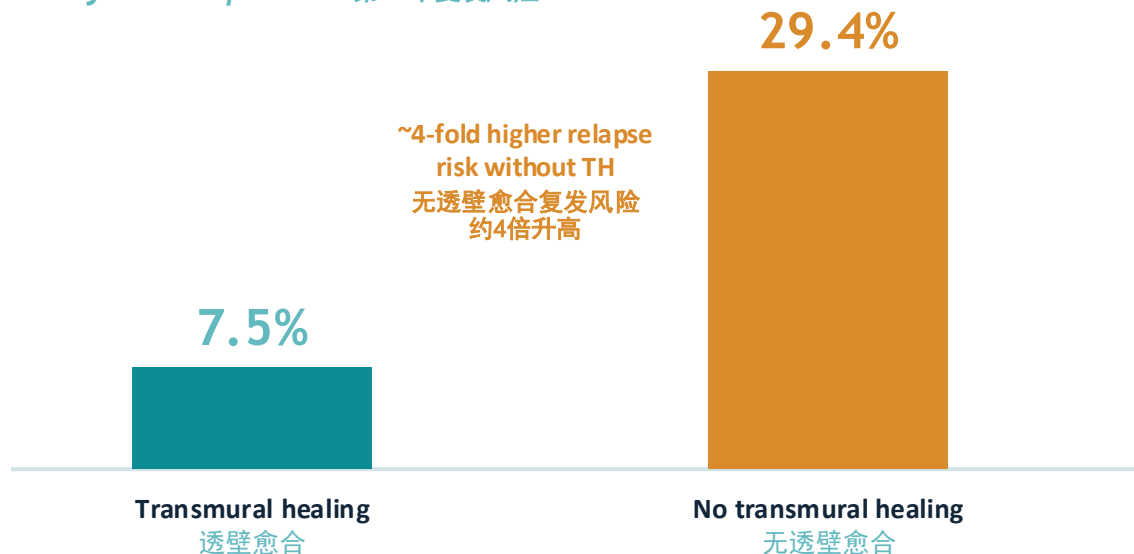
Endoscopic Healing (EH) is not the whole story

内镜愈合并非全部

72%

achieved TH among patients
with endoscopic healing
在内镜愈合患者中达到透壁愈合

First-year relapse risk 第一年复发风险



Lim CT et al. J Crohns Colitis 2025;19:jjaf149.

KEY MESSAGE After endoscopic healing, persistent bowel wall thickening identifies higher relapse risk.
内镜愈合后，持续肠壁增厚提示更高复发风险。

New-onset UC: IUS predicts disease course

新诊断UC: IUS预测疾病轨迹

Madsen et al. — Copenhagen IBD inception cohort



Madsen GR et al. J Crohns Colitis 2025;19:jjaf033.

KEY MESSAGE Baseline BWT and early TH may stratify UC risk soon after diagnosis.
基线BWT和早期透壁愈合可在诊断早期进行风险分层。

Early transmural remission predicts a favourable course

早期透壁缓解预测较佳疾病轨迹

59%

achieved TH at 3 months
诊断后3个月达到透壁愈合

3-month TH 3个月透壁缓解

Associated with:

- Higher steroid-free remission at 6/9/12M
- Lower steroid need
- Higher 12-month complete remission

相关结局:

- 6/9/12个月无激素缓解率更高
- 激素需求更低
- 12个月完全缓解率更高

Madsen GR et al. J Crohns Colitis 2025;19:jjaf033.

KEY MESSAGE Three-month TH may serve as an early prognostic marker in new-onset UC.

3个月透壁缓解可作为新诊断UC的早期预后指标。

Superb microvascular imaging (SMI)

超微血流成像

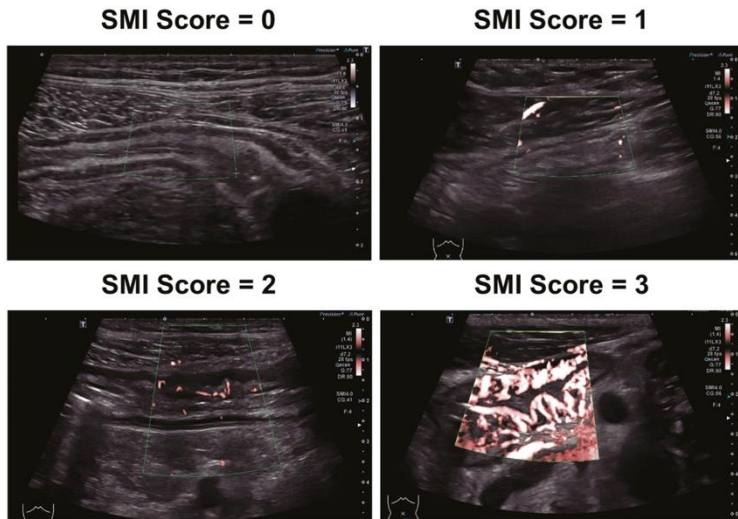


Figure 1: SMI score 0–3 examples SMI评分0–3示例

- SMI detects low-velocity microvascular flow that conventional imaging may miss
- Better correlation with UC disease activity than conventional Doppler
- Helpful for ruling out endoscopic activity

AUROC 0.98

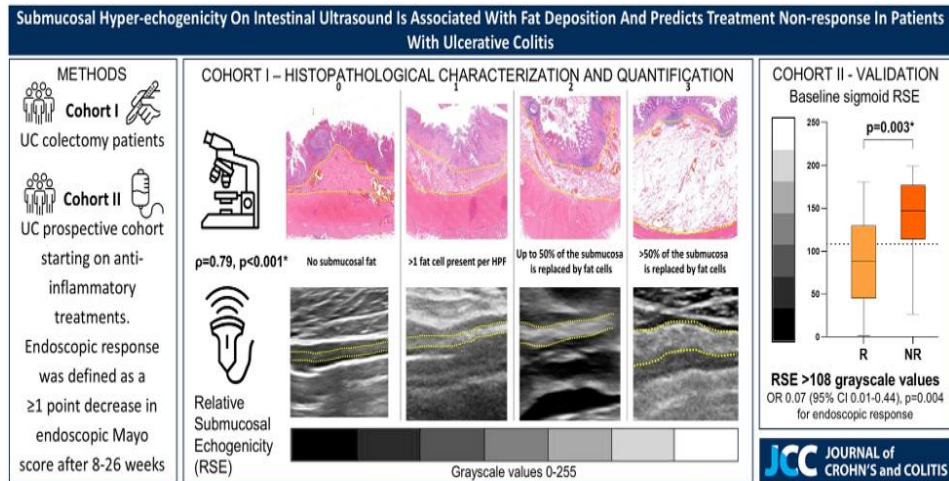
SMI score for endoscopic activity vs remission

Haberkamp S et al. Inflamm Bowel Dis 2025;31:2487–2495.

KEY MESSAGE SMI may refine assessment of inflammatory activity in UC. SMI可进一步完善UC炎症活动的评估。

Submucosal Hyperechogenicity: Tissue Remodeling and Response

黏膜下层高回声：组织重塑与疗效反应



- Submucosal hyperechogenicity was associated with fat deposition
- Quantified as relative submucosal echogenicity (RSE)
- Baseline RSE was higher in treatment non-responders
- RSE >108 grayscale values predicted non-response

RSE >108
predicts non-response

Pruitt MJ et al. J Crohns Colitis 2025;19:jjaf158.

KEY MESSAGE Submucosal hyperechogenicity may identify poorer treatment response. 黏膜下层高回声可能提示较差疗效反应。

TPUS: assessing distal UC and early response

经会阴超声：评估远端UC及早期疗效反应

Why TPUS? 为什么需要TPUS?

- Rectum is difficult for transabdominal IUS
- Rectal involvement is common
- TPUS complements transabdominal IUS

Distal UC staging

远端UC分期评估

- TRINITY study · n = 114 patients
- Compared TAUS vs TPUS vs EUS
- Best for proctitis & rectosigmoid colitis

EUS most accurate; TPUS most practical bedside option

Early response prediction

早期疗效预测

Week-1 rectal BWT reduction on TPUS predicted later mucosal healing

AUC 0.75

Clinical-endoscopic remission

AUC 0.80

Histo-endoscopic mucosal improvement

Rectal BWT reduction on TPUS outperformed sigmoid BWT reduction on TAUS

Sagami S et al. J Crohns Colitis. 2020;14:1649–1656; Pal P et al. Gut. 2025; Sagami S et al. J Crohns Colitis. 2025.

KEY MESSAGE TPUS complements TAUS by assessing distal rectal disease and early rectal wall response.

TPUS可补充TAUS，用于评估远端直肠病变及早期肠壁反应。

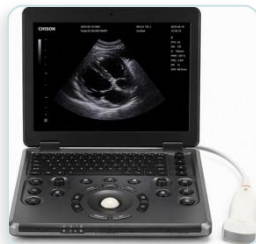
Handheld IUS: agreement with cart-based ultrasound

手持 IUS：与推车式超声的一致性

Increasing portability 便携性提升 →



Cart-based system
推车式系统



Portable laptop
便携式笔记本



Handheld probe
手持探头

UC-specific evidence Rispo 2023

- UC cohort, n=86
- Comparable BWT and disease extent assessment
- MUC agreement: $\kappa = 0.86$
- Endoscopic activity: Se ~80%, Sp ~88%

Real-world IBD evidence Fernandes 2025

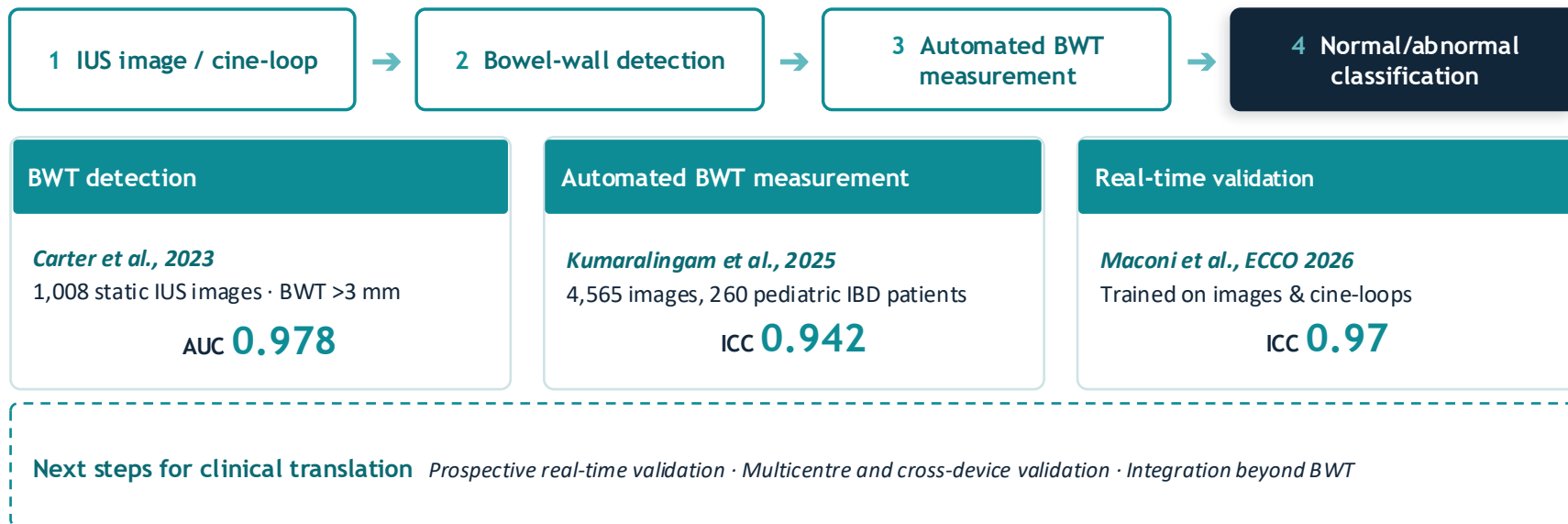
- Prospective IBD cohort, n=101; 49% UC
- Clarius / GE Vscan vs cart-based IUS
- Disease activity concordance: 93% / 91%
- Specificity 100%; sensitivity 85% / 76%

Role: *focused assessment and wider access; cart-based IUS remains preferred for detailed assessment.*

Rispo A et al. J Crohns Colitis 2023;17:1089–1096; Fernandes R et al. J Crohns Colitis 2025;19(Suppl 1):i2138–i2139.

AI-assisted IUS: automating BWT assessment

AI辅助IUS: 自动化BWT评估



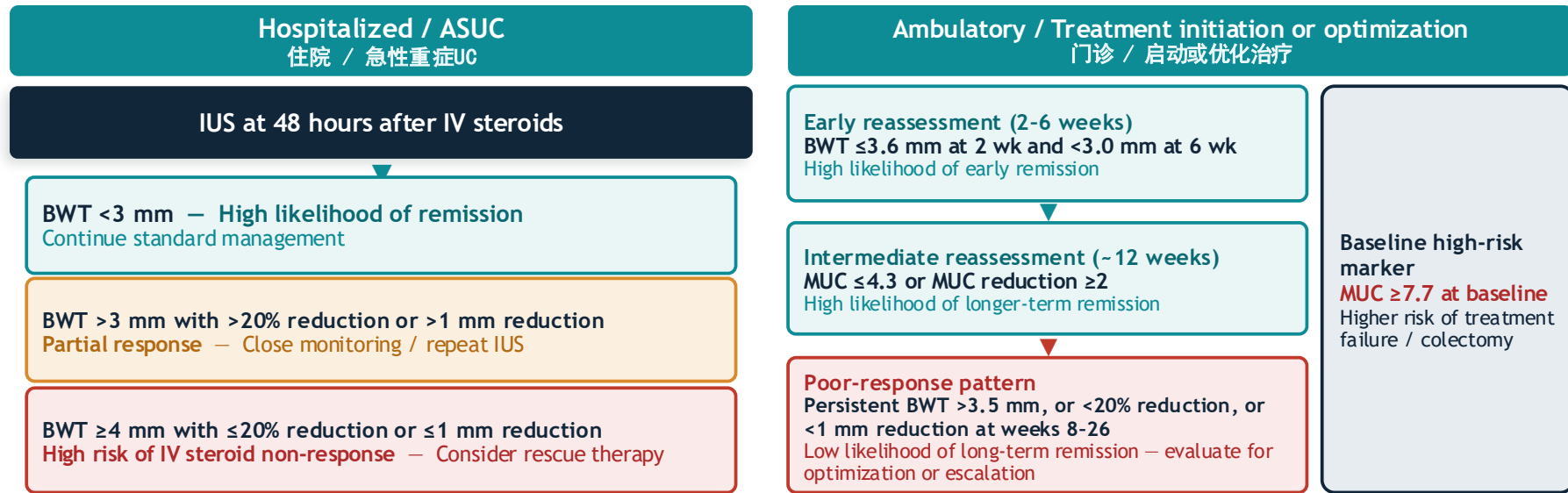
Carter D et al. Inflamm Bowel Dis. 2023;29:1901–1906; Kumaralingam L et al. J Crohns Colitis. 2025;19:jjaf037; Maconi G et al. J Crohns Colitis. 2026;20(Suppl 1):jjaf231.632.

KEY MESSAGE *AI is promising for automated BWT assessment, but broader clinical validation is still needed.*

A Practical IUS Monitoring Pathway in UC

UC患者的实用IUS监测路径

Adapted from Josefsen et al. J Clin Med. 2026



Josefsen S et al. J Clin Med. 2026;15:35.

KEY MESSAGE The value of IUS lies in repeated reassessment at clinically meaningful time points.

IUS的价值在于于关键临床时间点进行重复评估。

Take-home messages

总结

- 1 IUS in UC has moved from detection to management** UC-IUS已从诊断走向临床管理
- 2 Chinese and international guidelines now support IUS integration** 中国及国际指南均支持IUS整合入临床路径
- 3 BWT remains central; composite scores and new features add prognostic value** 综合评分和新特征增加预后价值
- 4 Early BWT/TH predicts clinically meaningful outcomes** 早期肠壁厚度/透壁愈合可预测临床结局
- 5 Complementary tools may expand access or refine assessment**
TPUS for distal rectum · handheld IUS for access · AI for assessment refinement TPUS用于远端直肠 · 手持IUS提升可及性 · AI优化评估

KEY MESSAGE *IUS in UC is evolving into a practical tool for monitoring, risk stratification, and individualized management.*

IUS正逐步成为UC监测、风险分层及个体化管理的实用工具。