international bowel ULTRASOUND GROUP

Review of the Examination, IBUS-CAT, and Recording

Michael Dolinger
Director of Pediatric Inflammatory Bowel Disease
Assistant Professor of Pediatrics
NYU Grossman School of Medicine

Chicago, IL, USA – July 26th – 27th, 2025

international bowel ULTRASOUND GROUP

Disclosure

- **Consultant for Neurologica Corp., a subsidiary of Samsung electronics co., ltd.**
- **Shareholder in Dova Health, formerly Satisfai**

- Other consultant roles: Pfizer, Johnson & Johnson, Abbvie, Celltrion

international bowel ULTRASOUND GROUP

Intended Learning Outcomes

By the end of this session, the learner will be able to:

1. Describe the purpose and overall structure of the IBUS Assessment of Technical Skills (IBUS ATS)
2. Identify and understand the four main domains and their subcomponents in the IBUS-ATS
3. Conduct an objective evaluation of anonymized IUS recordings using the IBUS-CAT
4. Understand the practical logistics of the examination and the instructions provided to participants and tutors
5. Reflect on principles and best practices for ensuring objective, standardized, and reproducible assessment in IUS

international bowel ULTRASOUND GROUP

Development of eLearning Platform For Standardization and Dissemination of Intestinal UltraSound Education Globally (IBUS eIUS Ed)

THE LEONA M. AND HARRY B. HELMSLEY CHARITABLE TRUST

1. Create an eLearning solution and centralized, shortened module 2 to enhance the current training model.
2. Establish an objective expert competency level + a pass/fail objective test in IUS skills/knowledge.
3. Assessment of learners' satisfaction, knowledge, skills and time to competency between new and traditional models.

international bowel ULTRASOUND GROUP

Domain 1: Ultrasound Examination and Preparation

a. Patient Position and Abdominal Exposure
b. Machine Care and Hygiene
c. Preset and Probe Selection
d. Probe Holding
e. Probe Maneuvering

international bowel ULTRASOUND GROUP

Patient Position and Abdominal Exposure

Demonstrate proper techniques for exposing the abdomen and positioning patients according to their needs and medical conditions.

Level	Criterion
1 **Unacceptable**	Abdomen poorly exposed and patient misaligned; visualization of ≥2 segments is compromised.
2 **Poor**	Abdomen partially exposed and patient sub-optimally positioned; visualization of ≥1 segment is compromised, hindering full evaluation.
3 **Adequate**	Abdomen sufficiently exposed and patient sub-optimally positioned; all segments are visible, but >1 segment is compromised.
4 **Good**	Abdomen clearly exposed and patient well positioned; all segments are visible, but 1 segment is compromised.
5 **Exemplary**	Abdomen fully exposed and patient perfectly positioned; no segments are compromised, and all segments are optimally visualized.

international bowel ULTRASOUND GROUP

Machine Care and Hygiene

Demonstrates appropriate techniques for maintaining the ultrasound machine and probes in a clean and functional condition before, during, and after the examination, including proper disinfection procedures and equipment handling to prevent damage.

Level	Criterion
1 **Unacceptable**	Ignores hygiene protocols, leaves equipment soiled; no disinfection – risking machine damage.
2 **Poor**	Inconsistent cleaning; misses key disinfection steps; careless equipment handling.
3 **Adequate**	Follows basic protocols; equipment left clean, but thorough steps may be rushed or omitted.
4 **Good**	Consistently performs full cleaning and disinfection; equipment is ready for next use
5 **Exemplary**	Performs pre- and post-exam inspections, deep cleaning, and precise handling; leaves equipment fully clean, next-user–ready condition.

international bowel ULTRASOUND GROUP

Preset and Probe Selection

Control navigation and ultrasound machine menu controls for image acquisition.

Level	Criterion
1 **Unacceptable**	Chooses an inappropriate probe/preset and/or cannot operate basic controls; produces no usable image and fails to document bowel segment(s).
2 **Poor**	Chooses an inappropriate initial probe/preset or struggles significantly (>2 min) with basic controls; yields poor image quality that hinders the exam.
3 **Adequate**	Chooses the appropriate probe/preset; locates essential controls (≤2 min); produces a fair but unrefined image.
4 **Good**	Chooses the appropriate probe/preset and essential controls (≤0.5 min); achieves clear, well-set images across most segments using only those controls.
5 **Exemplary**	Chooses the appropriate probe/preset instantly and operates all controls without hesitation; captures perfect, diagnostic frames for every segment.

international bowel ULTRASOUND GROUP

Probe Holding

Demonstrates ergonomic grip, appropriate pressure, and correct cranial/caudal & left/right orientation while ensuring patient comfort.

Level	Criterion
1 **Unacceptable**	Inappropriate and/or unstable probe grip; pressure is either too light or too heavy, causing patient discomfort; orientation is repeatedly incorrect.
2 **Poor**	Inappropriate probe grip: pressure is too light or too heavy, compromising patient comfort; orientation is occasionally incorrect.
3 **Adequate**	Appropriate probe grip; sufficient pressure; orientation is accurate or quickly corrected.
4 **Good**	Appropriate probe grip and compression pressure, though minor improvements (e.g., displacing bowel gas) are possible; orientation is consistently correct.
5 **Exemplary**	Appropriate probe grip and compression pressure ideal to minimize artifact and clearly demonstrate bowel segment(s); orientation is consistently correct.

international bowel ULTRASOUND GROUP

Probe Maneuvering

Implement image centering techniques effectively to position the ultrasound probe accurately over target structures for optimal image quality through the use of rotating, sweeping, sliding, rocking, fanning/tilting, etc.

Level	Criterion
1 **Unacceptable**	Probe movements are irregular; cannot center or follow the bowel; most images are unusable.
2 **Poor**	Probe movements are irregular; inconsistent centering; visualization is poor, some images are adequate, but some are unusable.
3 **Adequate**	Probe movements are regular, demonstrates basic techniques to center and follow the bowel most of the time; obtains adequate images.
4 **Good**	Probe movements are regular, employs a full range of maneuvers to center the bowel; produces adequate images of most segments with only occasional minor delays.
5 **Exemplary**	Probe movements are regular, employs full range of maneuvers and dynamically uses all probe movements to track and center all loops; consistently captures optimal images of every bowel segment.

international bowel ULTRASOUND GROUP

Domain 2: Image Optimization

a. Depth
b. Gain
c. Focus
d. Freeze (and scroll)
e. Color Doppler Imaging

international bowel ULTRASOUND GROUP

Depth

Adjust depth appropriately to visualize the varying depths of the bowel and extra-intestinal structures of interest.

Level	Criterion
1 **Unacceptable**	No depth control: images are too deep or too shallow, causing bowel segments to be cut off or minimized.
2 **Poor**	Sporadic or incorrect depth control; ≥2 segments are cut-off or minimized due to depth errors.
3 **Adequate**	Adjusts depth to include all segments in the field; however, ≥2 segments are not optimally framed (excess >3 cm beyond the posterior bowel wall).
4 **Good**	Continuously adjusts depth for most loops; only 1–2 segments fall outside the ideal 1–2 cm margin.
5 **Exemplary**	Continuously refines depth so every loop sits approximately 1–2 cm from the image edge.

international bowel ULTRASOUND GROUP

Gain

Adjust gain settings to optimize brightness/contrast balance to enhance image clarity while minimizing artifacts.

Level	Criterion
1 **Unacceptable**	No gain adjustment; image is consistently too dark or too bright.
2 **Poor**	Inconsistent gain adjustment; attempts gain adjustments sporadically or incorrectly; image is consistently too dark or too bright.
3 **Adequate**	Sets an appropriate overall gain with occasional adjustments; image is too bright or dark in ≥2 segments.
4 **Good**	Sets an appropriate overall gain and performs only occasional adjustments as needed. Image is too bright or dark in ≤1 segment.
5 **Exemplary**	Sets an appropriate overall gain and continuously and precisely adjusts gain for all segments. No image is too bright or too dark.

international bowel ULTRASOUND GROUP

Focus

Adjust focus appropriately (autofocus = 3) to the structure of interest during scanning.

Level	Criterion
1 **Unacceptable**	Focus is ≥3 cm off target in ≥3 segments, no focus adjustment.
2 **Poor**	Focus is ≥2 cm off target in ≥2 segments; minimal or incorrect attempts to adjust; autofocus, if available, not used.
3 **Adequate**	Activates autofocus/full-focus mode or manually sets focus ≥1 cm off target in ≥2 segments.
4 **Good**	Manually adjusts focus to the bowel of interest for most views; in 1 segment, focus drifts slightly off depth.
5 **Exemplary**	Consistently ensures focus to the bowel of interest for all views via precise manual adjustments.

international bowel ULTRASOUND GROUP

Freeze (and scroll)

Demonstrate utilizing the freeze ± scroll function to identify the optimal still image.

Level	Criterion
1 **Unacceptable**	No freeze or random freeze; no scroll; unacceptable images in ≥ 3 segments.
2 **Poor**	Mostly inappropriate freeze timing; no effective scroll; unacceptable images in ≥ 2 segments.
3 **Adequate**	Appropriate freeze timing; minimal or inconsistent scroll; unacceptable images in ≥ 1 segment.
4 **Good**	Appropriate freeze timing; occasional scrolling to improve frame selection; captures clear images in all segments.
5 **Exemplary**	Appropriate freeze timing; systematic scrolling to select the best frame and captures clear images in all segments.

international bowel ULTRASOUND GROUP

Color Doppler Imaging

a. Utilizing optimal settings for scale (±5-7 cm/s)
b. Box size (> 1 cm surrounding the bowel)
c. Appropriate color Doppler gain settings (just below noise level) d. Minimizing breathing and movement artefacts
e. Sufficient assessment time (≥ 3 s)

Level	Criterion
1 **Unacceptable**	0–1 parameter correct.
2 **Poor**	2 parameters correct.
3 **Adequate**	3 parameters correct.
4 **Good**	4 parameters correct.
5 **Exemplary**	All parameters correct.

international bowel ULTRASOUND GROUP

Domain 3: Systematic Examination

a. Anatomic Landmarks
b. Systematic Bowel Examination
c. Scan Plane Control
d. Entire Segment
e. Identify Bowel Segments

international bowel ULTRASOUND GROUP

Anatomic Landmarks

a. Right iliac vessels/psoas muscles for TI,
b. Left iliac vessels/psoas muscles for SC,
c. Stomach/liver for TC,
d. Spleen for splenic flexure,
e. Liver for hepatic flexure
f. Boundaries of the entire abdominal cavity, including the bladder/iliac crest bones, pelvic, and lateral abdominal walls.

Level	Criterion
1 **Unacceptable**	No landmarks identified, or all attempts are incorrect.
2 **Poor**	1-2 landmarks correctly identified.
3 **Adequate**	3 landmarks correctly identified.
4 **Good**	4–5 landmarks correctly identified.
5 **Exemplary**	≥6 landmarks identified.

international bowel ULTRASOUND GROUP

Systematic Bowel Examination

a. Demonstrate a systematic scan to cover all large & small bowel segments (4+2)*
b. Start with EITHER SC/(rectum) and scan in the oral direction to (N)TI, OR start with (N)TI and scan in the anal direction to SC/(rectum)
c. Perform a sweep of the abdomen to look for small bowel pathology

**1. SC, 2. DC, 3. TC, 4. AC/CEC, 5. TI/NTI, 6. Proximal small bowel sweep, (transvesical rectum & appendix is optional)*

Level	Criterion
1 **Unacceptable**	Scans ≤3 core segments; no consistent order, performs random sweeps.
2 **Poor**	Scans 4–5 core segments; misses 1 entirely (no attempt) or is disorganized.
3 **Adequate**	Scans 5–6 core segments, with uncertainty about 1 segment; slightly disorganized.
4 **Good**	Scans all 6 core segments in an organized manner, incomplete proximal small bowel sweep is performed, does not perform optional pelvic (transvesical) rectal view or appendix attempt.
5 **Exemplary**	Scans all 6 core segments, includes a full proximal small bowel sweep, and additionally performs an optional pelvic (transvesical) rectal view or appendix attempt.

international bowel ULTRASOUND GROUP

Scan Plane Control

Demonstrate maneuverability between anatomical scan planes (axial/sagittal) and bowel scan planes (cross-section vs. longitudinal).

Level	Criterion
1 **Unacceptable**	Cannot establish correct scan planes; images remain oblique for most segments.
2 **Poor**	Attempts correct scan planes, but transitions often fail; Images remain oblique for most segments.
3 **Adequate**	Achieves mostly correct scan planes with hesitation; transitions are difficult and some fail. Most images are correct, but some may be slightly oblique.
4 **Good**	Achieves mostly correct scan planes; transitions are smooth; images are not oblique; both bowel scan planes demonstrated in only 1–2 segments.
5 **Exemplary**	Achieves all correct scan planes; transitions are smooth with consistent precise alignment; optimal true axial/sagittal and cross/longitudinal images are demonstrated throughout all segments (≥3).

international bowel ULTRASOUND GROUP

Entire Segment

Demonstrate scanning through the entire segment (>80% of the segment covered) at an adequate scanning speed (1–4 cm/s) in a consistent direction.

Level	Criterion
1 **Unacceptable**	No movement across the segment or erratic, uncontrolled back-and-forth (<0.5 cm/s or >10 cm/s).; ≤1 segment shown entirely.
2 **Poor**	Attempts a full segment sweep/slide but is erratic—too fast (> 4 cm/s) or too slow (< 1 cm/s)—with many back-and-forth movements; only 2–3 entire segments shown.
3 **Adequate**	Generally, moves along the segment but with variable speed (outside the 1–4 cm/s range) or inconsistent direction; 4–5 segments shown in entirety.
4 **Good**	Smooth scan in one direction at an adequate speed (1–4 cm/s); 5 segments shown in entirety.
5 **Exemplary**	Flawless, deliberate sweep/slide at an adequate speed (1–4 cm/s); all 6 segments fully shown.

international bowel ULTRASOUND GROUP

Identify Bowel Segments

Find and differentiate between the stomach, the large and small bowel, and the transition between the terminal ileum and the cecum (based on anatomical location, haustral pattern, small bowel folds, peristalsis, content, and diameter).

Level	Criterion
1 Unacceptable	Frequent major errors: confuses small and large bowel or misidentifies major segments; ≤2 correct identifications.
2 Poor	One or two significant errors on specific segments or at the terminal ileum (TI)–cecum transition; identifies only 3–5 segments correctly.
3 Adequate	Minor errors or hesitation on one segment; correctly identifies/labels 5–6 segments/transitions.
4 Good	Correctly labels all six core segments but fails to identify or label the TI–cecum transition.
5 Exemplary	Completely error-free; labels all six core segments and the TI–cecum transition without hesitation.

international bowel ULTRASOUND GROUP

Domain 4: Exam Documentation

a. Annotation
b. Image Selection and Storage
c. Research Data Acquisition
d. Structured Report
e. Confidence and Limitations

international bowel ULTRASOUND GROUP

Annotation

Annotate all stored images and cine loops

Level	Criterion
1 Unacceptable	0–19% of saved images/cine loops annotated or annotations are mostly wrong.
2 Poor	20–59% of images/cine loops annotated; annotations may be wrong.
3 Adequate	60–79% of images/cine loops annotated; annotations are mostly correct.
4 Good	80–95% of images/cine loops; rare minor mistakes.
5 Exemplary	96–100% of images/cine loops annotated correctly.

international bowel ULTRASOUND GROUP

Image Selection and Storage

Select and store representative still images and cine loops for core segments (minimum 5 core segment stills + 3 research cine loops + 2 research stills with measurements).

Level	Criterion
1 **Unacceptable**	Documents **0-19 %** of expected OR those images/loops stored are unclear or unrepresentative.
2 **Poor**	Documents **20-59 %** of expected. Images/loops may be poorly framed or less representative.
3 **Adequate**	Documents **60-79 %** with mostly representative images/loops.
4 **Good**	Documents **80-95 %;** all images/loops are representative.
5 **Exemplary**	Documents **96-100 %.** Every stored image/loop is clear, accurately framed, and representative.

international bowel ULTRASOUND GROUP

Research Data Acquisition

a. 1 cine loop cross-section (entire segment)
b. 1 cine loop longitudinal (entire segment)
c. 1 cine loop with color Doppler signal (in cross-section)
d. 2 BWT measurements in cross-section with > 90 degrees apart
e. 2 BWT measurements in longitudinal with > 1 cm apart

Level	Criterion
1 **Unacceptable**	Completes **0–1** element or shows major issues across all elements.
2 **Poor**	Completes **2** elements or demonstrates major issues across all elements.
3 **Adequate**	Completes **3** elements or shows some issues across most elements.
4 **Good**	Completes **4** elements with only minor issues across some elements.
5 **Exemplary**	Completes all **5** elements completely and accurately.

international bowel ULTRASOUND GROUP

Structured Report

After the scan, generate a structured report with accurate descriptions, measurements, and a summary of findings

Level	Criterion
1 Unacceptable	No coherent structure: findings poorly or not described; measurements absent; no summary.
2 Poor	Poor structure; significant omissions or inaccuracies in descriptions; most measurements missing or incorrect; no clear summary.
3 Adequate	Adequate structure: main findings described; some measurements or grading included; summary is vague or incomplete.
4 Good	Clear structure: most findings and measurements/grading accurately reported; minor omissions; summary is mostly clear.
5 Exemplary	Clear structure; complete and accurate descriptions of all findings and required measurements; concise, informative, clear summary.

international bowel ULTRASOUND GROUP

Confidence and Limitations

Document the scan quality, completeness, and any limitations that may impact the final interpretation/conclusion.

Level	Criterion
1 Unacceptable	No mention of scan quality or limitations; over- or under-confident; unrealistic conclusions; no suggestions for further testing.
2 Poor	Limited or vague acknowledgement of limitations or scan quality; confidence does not match quality; follow-up suggestions are absent or inappropriate.
3 Adequate	Notes obvious limitations; confidence generally reflects scan quality; may suggest further testing, but not clearly aligned with limitations.
4 Good	Clearly documents significant limitations and scan completeness; confidence reflects scan quality; suggests appropriate further testing or management in most cases.
5 Exemplary	Precisely documents all limitations and their impact; confidence is perfectly calibrated; specific, justified recommendations for further evaluation if needed.

international bowel ULTRASOUND GROUP

Structured Report

Standardized IUS Reporting Template

Participant number: ------ Room number: ------ Recordings number: ------
Indication for Examination:

Conclusion:

Vascularization (IBUS-SAS Color Doppler Score):

Segmental Assessment of Findings:

- Rectum:
- Sigmoid colon:
- Descending colon:
- Transverse colon:
- Ascending colon:
- Terminal ileum:
- Proximal small bowel:

Other Findings / Complications:

Descriptions and Measurements:

1. *Wall thickness, stratification, vascularity, motility, prestenotic dilatation (where applicable)*
2. *Measurements should be in both longitudinal and cross-sectional views*
3. *Optional Descriptive finding (e.g., granuloma, fistula, stenosis, fluid, fat wrapping)*

Overall Image Quality and Completeness: ☐ High ☐ Moderate ☐ Low
Confidence in Diagnostic Conclusion: ☐ High ☐ Moderate ☐ Low
Noted Limitations (if any) (*e.g., patient habitus, bowel gas, postoperative anatomy)*

---

international bowel ULTRASOUND GROUP

IBUS-CAT

Domain 1: Ultrasound equipment and preparation (circle one)

1. Patient position and abdominal exposure	1	2	3	4	5
2. Machine care and hygiene	1	2	3	4	5
3. Preset and probe selection(s)	1	2	3	4	5
4. Probe holding	1	2	3	4	5
5. Probe maneuvering	1	2	3	4	5

*Feedback:

*Guidelines for providing constructive feedback for improvement, either through real-time guidance or post-assessment review sessions.

_____

_____

Total applied knowledge (5-25) _____

Domain 2: Image optimization (circle one)

6. Depth	1	2	3	4	5
7. Gain	1	2	3	4	5
8. Focus	1	2	3	4	5
9. Freeze (and scroll)	1	2	3	4	5
10. Color Doppler Imaging	1	2	3	4	5

*Feedback:

*Guidelines for providing constructive feedback for improvement, either through real-time guidance or post-assessment review sessions.

_____

_____

Total applied image optimization (5-25) _____

Domain 3: Systematic examination (circle one)

11. Anatomical landmarks	1	2	3	4	5
12. Systematic bowel examination	1	2	3	4	5
13. Scan plane control	1	2	3	4	5
14. Entire segment	1	2	3	4	5
15. Identify bowel segments	1	2	3	4	5

*Feedback:

*Guidelines for providing constructive feedback for improvement, either through real-time guidance or post-assessment review sessions.

_____

_____

Total applied systematic examination (5-25) _____

Domain 4: Exam documentation (circle one)

16. Annotation	1	2	3	4	5
17. Image selection and storage	1	2	3	4	5
18. Research data acquisition	1	2	3	4	5
19. Structured report	1	2	3	4	5
20. Confidence and Limitations	1	2	3	4	5

*Feedback:

*Guidelines for providing constructive feedback for improvement, either through real-time guidance or post-assessment review sessions.

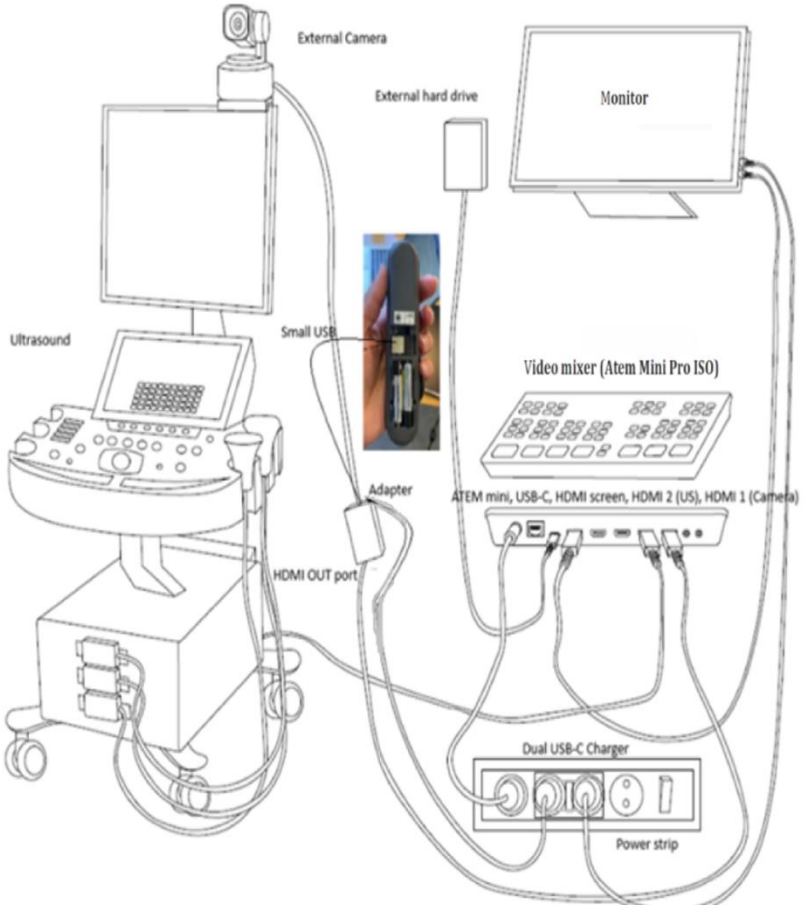
_____

_____

Total applied documentation (5-25) _____

international bowel
ULTRASOUND GROUP

Recording



international bowel
ULTRASOUND GROUP

Questions?