Standardizing IUS acquisition & site qualification

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Site Qualification

Equipment

IUS performer competence/experience

Test-case

Standard acquisition

Preparation

Cineloops

Scan Planes

Color Doppler Signal (CDS)

Quality issues

Specific challenges

How to overcome

Optimizing Intestinal Ultrasound

- Optimizing intestinal ultrasound cineloops involves several steps to ensure that you capture high-quality images and videos of the intestines. Cineloops are a series of ultrasound images taken in quick succession, creating a dynamic video-like representation of the area being examined.

Tips to optimize intestinal ultrasound cineloops:

✓ **Patient Preparation**

- Position the patient comfortably on the examination table, lying on their back.

✓ **Patient Cooperation**

- During bowel examination, breath-holding is recommended to reduce artifacts. Move the probe slowly (to reduce artifacts) to ensure the part with the highest blood flow is captured.

Site qualification

✓**Ultrasound machine**

- High-end machine preferred (mid-range depends on quality)
- 2 probes: Dedicated probe <u>5-8 MHz</u> (2-12 MHz) + abd. probe
- Record cineloops for 10 s
- Annotate cineloops
- Export in DICOM – DICOM license (NB: Compression quality)

✓**IUS Performer qualifications**

✓**Approved test case**

Transducers

5-8 MHz

Nylund K et al., Ultraschall Med 2016

Site qualification

✓ **Ultrasound machine**

✓ **IUS Performer qualifications**

- An approved sonographer (i.e., machine operator)
- This is a gastroenterologist, pediatrician, radiologist, sonographer or ultrasound technician trained in IUS
- Recommendation: Full IBUS/GENIUS formal training or equivalent experience = 1 year of experience or more + approximately 100 annual IUS

✓ **Approved test case**

THE IUS EXPERT CURVE: FINDING THE SWEET SPOT

EXPERTISE LEVEL (Proficiency & Accuracy)

Master (High)

Novice (Low)

NUMBER OF IUS EXPERTS (Availability & Reach)

Few (Scarce)

Many (Widespread)

CUT-OFF 1: High Volume Centers & Mentorship

Suggestion: Concentrate training in centers of excellence. Emphasize hands-on mentorship for complex cases.

CUT-OFF 2: Standardized Training & Certification

Suggestion: Implement formal, standardized competency assessments and certification programs.

CUT-OFF 3: Widespread Adoption & AI Support

Suggestion: Utilize AI-assisted tools and telemedicine for basic screening and wider reach, with expert oversight.

Infographic Design by [Fictional Studio Name]

IBUS Competency Assessment Tool (CAT)

KNOWLEDGE

Module 1: Theory (workshop, eLearning)

Test: MCQ, online

INTERPRETATION SKILLS

Module 2: Case exposure (Clinic, eLearning)

Test: DICOM Reader, online

TECHNICAL SKILLS

Module 2: Supervised hands-on training (Clinic)

Test: Assessment of technical skills, RECORDING

Site qualification

✓**Ultrasound machine**

✓**IUS Performer qualifications**

✓**Approved test case**

- Based upon the study-specific instruction manual
- Check for quality standards during the study startup period
- Comprehensive feedback for features to improve
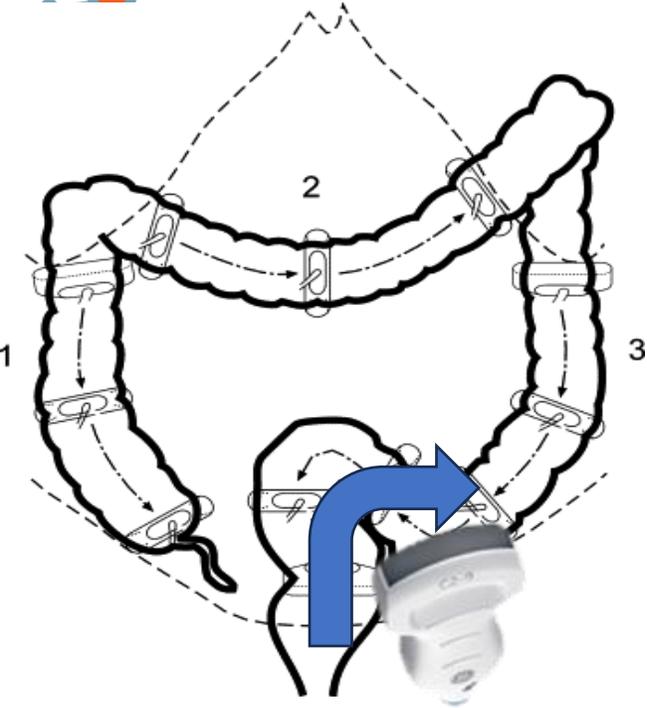
Typical requirements for central reading

- Fasting not required

- 1 cineloop in longitudinal

- 1 cineloop in cross-section

- 1 cineloop with color Doppler imaging (cross-section preferred)

LONGITUDINAL

CROSS-SECTION
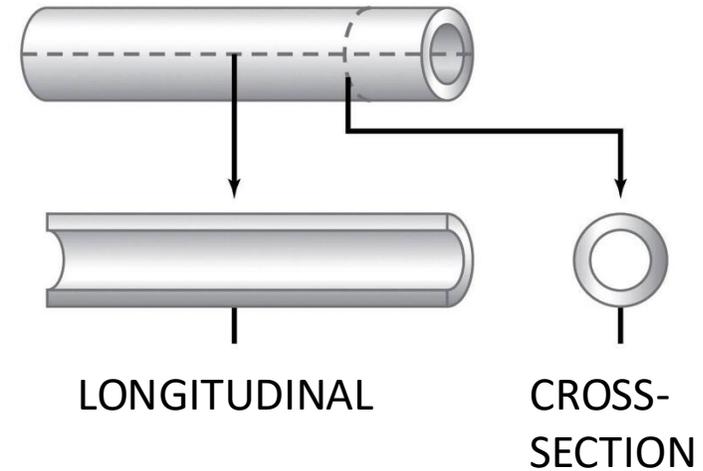
This way we can perform almost any activity score

- More requirements will demand more skills

Ultrasound Techniques

Hover over the picture and click Play ->

How to optimize IUS scanning

COLOR DOPPLER + CALIPER

BY RUNE WILKENS

Hover over the picture
and click Play ->

List of low-quality features

1. **Entire segment**: Only showing a small proportion of the segment
2. **Probe**: Only abdominal probe, too low or too high frequency used – poor IUS preset.
3. **Wrong bowel segment:** The segment of interest is not recorded – e.g. small bowel/stomach misinterpreted as colon
4. **Depth**: Too shallow or too deep.
5. **Color Doppler**: Scale settings, Doppler gain, box size, movement or breathing artefacts, too short
6. **Annotation**: No/wrong or obstructing annotation
7. **Missing scans:** No longitudinal scan, No cross-sectional scan, No color Doppler scan
8. Scan is **oblique** or with **inconsistent** recording direction
9. **Gain**: Too bright or too dark
10. **Focus**: Not on bowel
11. **Duration/direction**: Too short or moving the probe too fast or too much back and forth(inconsistent)
12. **Overall**: Body composition/hair/scar/umbilicus OR too little downward pressure or gel OR old/poor machine
13. *Export Quality: Too lossy export quality*

Specific challenges

- Technical: Changing depth while recording => calibration/export issues
- Technical: Insufficient recording time => need for application specialist
- Operational: Insufficient acquisition = data lost / reexamination needed
- Site selection based upon high-recruiting countries or sites – not IUS
- Upgrading sites for IUS – not something you can do overnight

How to overcome challenges

- Prioritize "IUS"-countries

- Database of certified centers / IUS performers

- More focus on dedicated training in IUS research acquisition

- Dedicated presets and IUS machine protocols for research

- Solving the calibration issue in collaboration

Thank you