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Intestinal Ultrasound

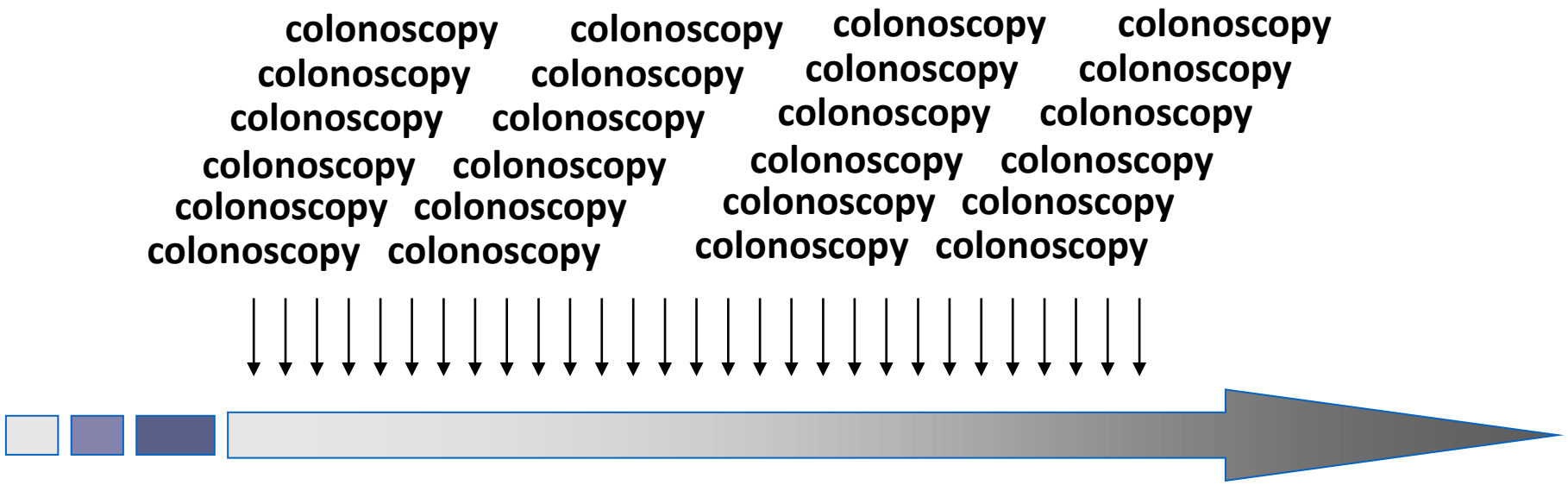
14th Fellow Weekend, March 18th 2023

Gerhard Rogler, Department of Gastroenterology and Hepatology, University of Zurich, Switzerland

Intestinal ultrasound

- Not difficult to learn (start doing it: there is a fast learning curve)
- Gives you information right when you see the patient (as long as you do it yourself)
- Is objective (bowel wall thickness is an objective parameter)
- Is a fest exam (5 min will be sufficient for most questions)

Only few IBD patients accept this monitoring strategy:



Assessment of disease activity? → **Monitoring of treatment efficacy**

Specificity and Sensitivity are comparable to MRI and CT

	Mean sensitivity estimates for diagnosis of IBD on a per-patient basis	Mean per-patient specificity	Mean per-bowel-segment sensitivity	Mean per-bowel-segment specificity
US	89.7%	95.6%	73.5%	92.9%
CT	93.0%	92.8%	70.4%	94.0%
MR	84.3%	95.1%	67.4%	90.2%

33 trials for final analysis

→ no significant differences in diagnostic accuracy between different methods

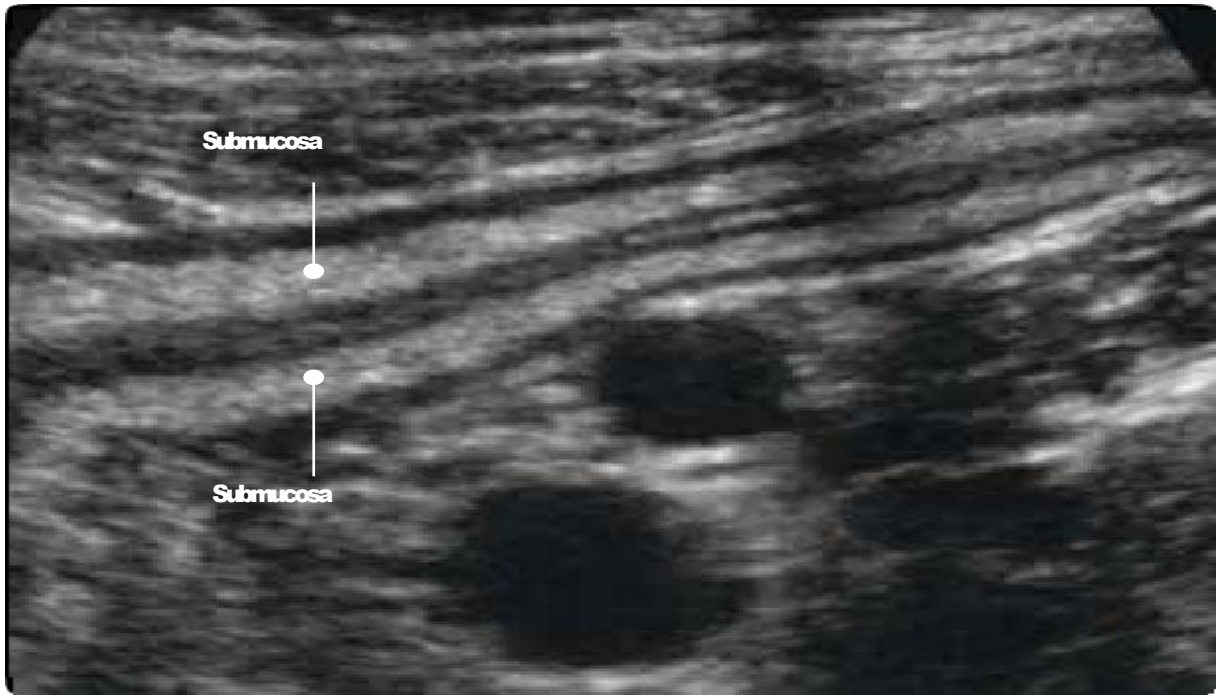
Horsthuis K et al. *Radiology* 2008

How patients should prepare for intestinal ultrasound

- Typically patients are requested to avoid food and drinks (fast) for eight to 12 hours before an abdominal ultrasound

- However, for intestinal ultrasound you want the colon filled with gas to allow easy identification ➔ send fasting patients for a coffee and some food!

Intestinal mural stratification



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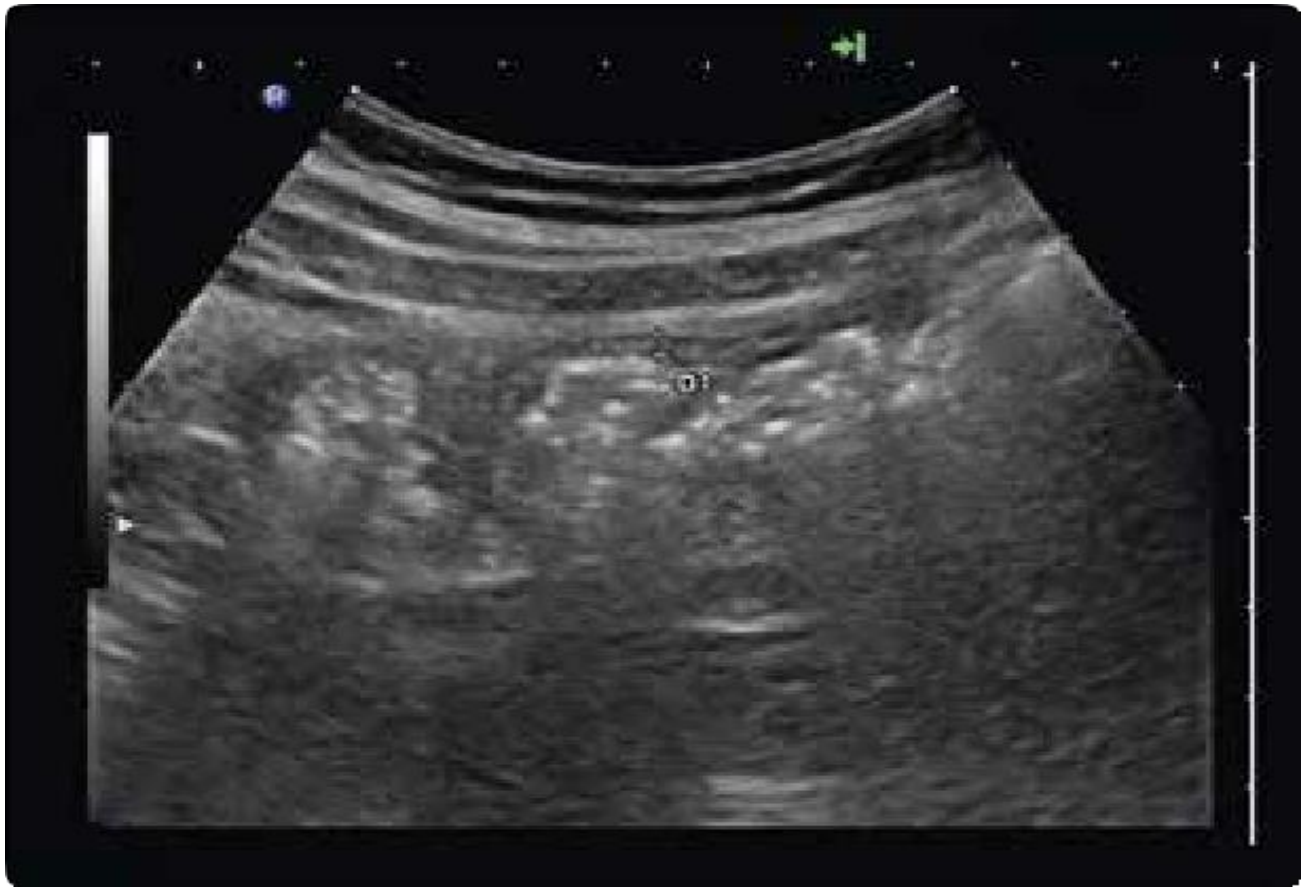
Normal intestinal wall



Parameters you need to keep in mind

	Small Intestine	Large Intestine
Wall thickness	≤ 2 mm	≤ 2 mm
Diameter	≤ 2.5 – 3 cm	≤ 5 cm
Special	Valves of Kerckring	Haustriae

Refernce: Rilinger N et al. The value of various ultrasound criteria in objective assessment of acute reactive cholecystitis. A prospective follow-up study of venti- lated intensive care patients. Aktuelle Radiol. 1994 Nov;4(6):333 – 6.

Intestinal Ultrasound: Assessment criteria

- **Wall thickness**
- Wall structure
  - Preserved /accentuated /lost stratification
- Blood flow (normal – increased)
  - Normal or increased (you don’t need the Limber Index!)
- Complications
  - Fistulae (e.g. interenteric, enterocutaneous, enterovesical)
  - Abscesses
  - Strictures
  - Enlarged Lymph nodes
  - Free fluid
- Motility
- «Fibrofatty proliferation» (mesenteric reaction to inflammation: hyperechogenic)
- Dilatation

A patient case: Male patient (43y) with Crohn's disease, abdominal pain, fever (1)

Medical Report

- First diagnosis of CD **11/2005**
- Ileocecal resection 2015
- Since then, intermittend steroids, no continuous therapy

Situation at presentation (03/2022)

- Had some abdominal pain over the last two months
- Intermittend fever
- No diarrhea

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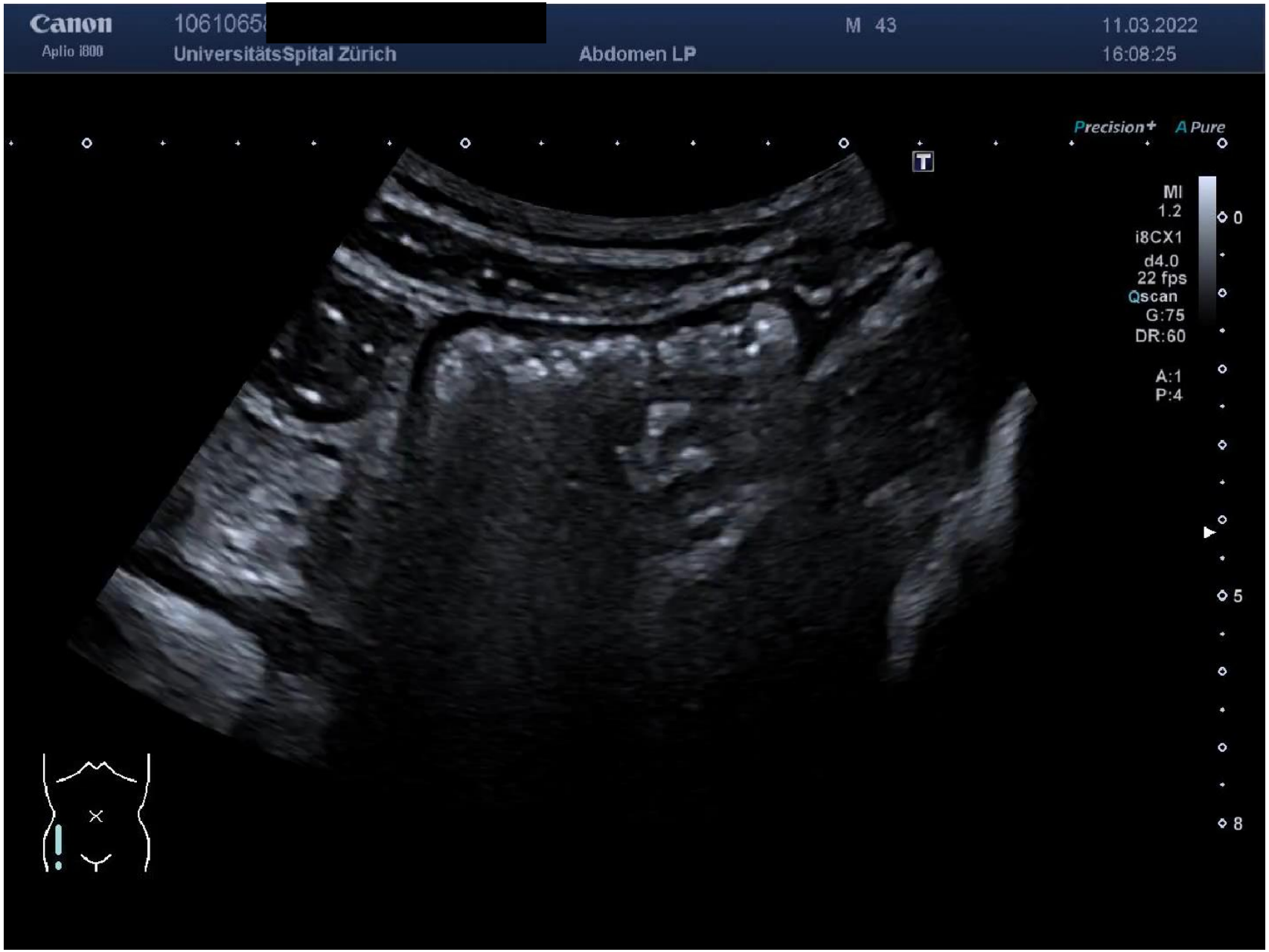
A patient case: Male patient (43y) with Crohn's disease, abdominal pain, fever (2)



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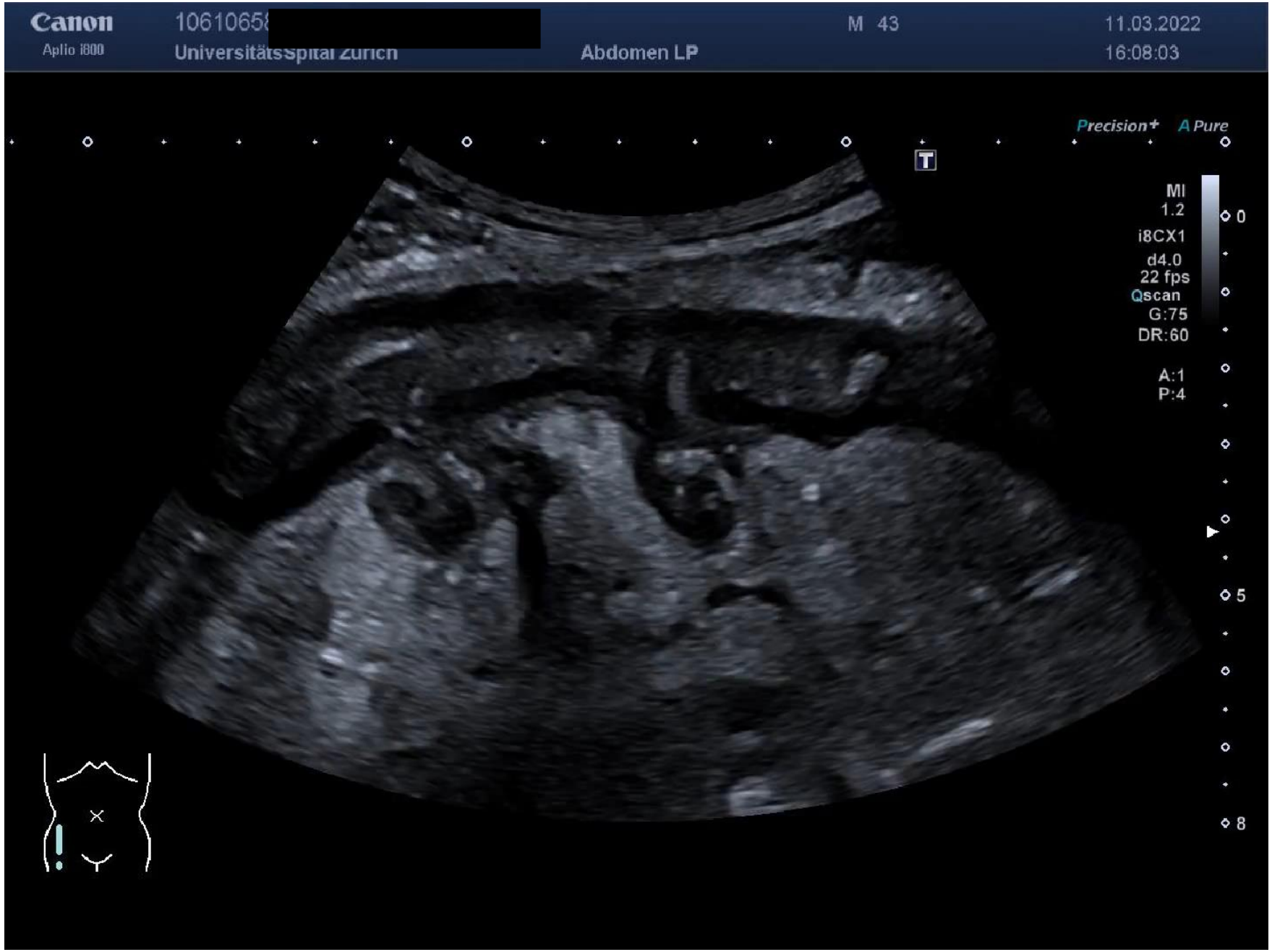
A patient case: Male patient (43y) with Crohn's disease, abdominal pain, fever (3)



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Wall thickening of the terminal ileum

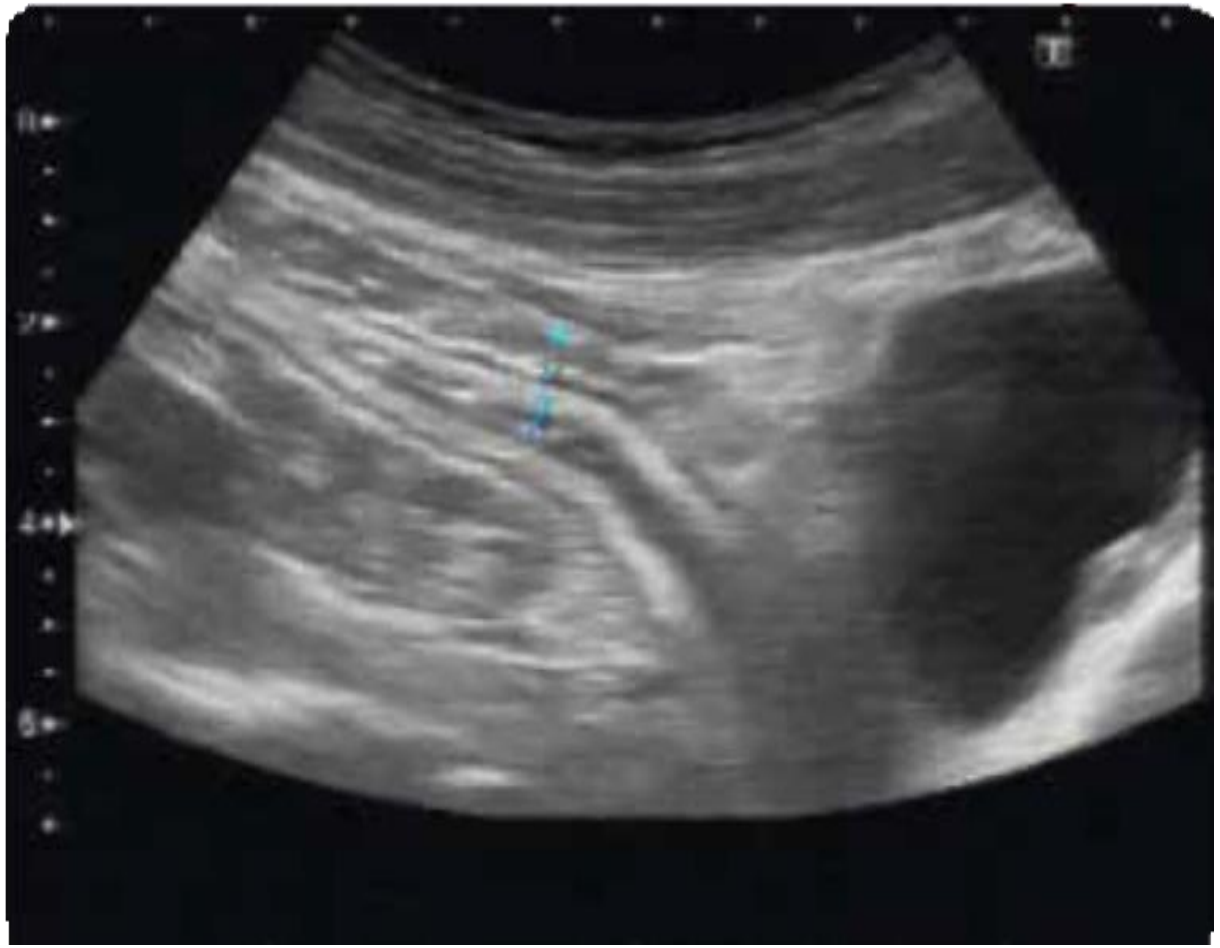
Table 1 Differential diagnosis of asymmetrical terminal ileal thickening with chronic symptoms

Crohn's disease
Actinomycoses
Mycobacteria tuberculosis
Lymphoma
Neoplasia
NSAID enteropathy

Atkinson NSS, Bryant RV, Dong Y, Maaser C, Kucharzik T, Maconi G, Asthana AK, Blaivas M, Goudie A, Gilja OH, Nuernberg D, Schreiber-Dietrich D, Dietrich CF. How to perform gastrointestinal ultrasound: Anatomy and normal findings. World J Gastroenterol. 2017 Oct 14;23(38):6931-6941.

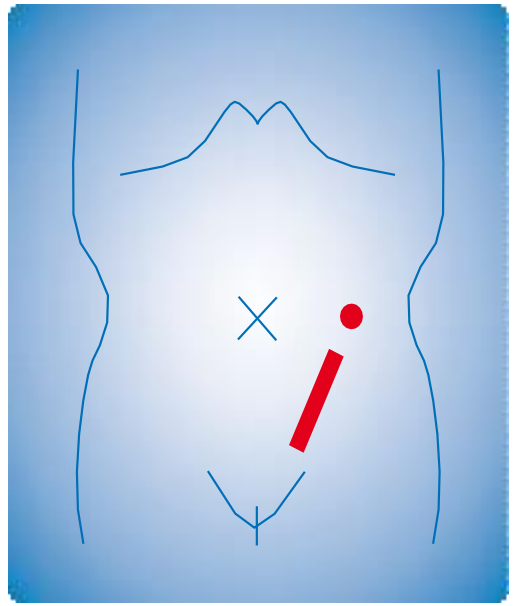
Ulcerative colitis

Distal sigmoid colon /rectum with wall thickening



- **Don’t believe anybody telling you UC is restricted to the mucosa!**
- **In intestinal ultrasound the most affected intestinal wall layer is the SUBMUCOSA!**

Rectum /sigmoid colon with thickened wall.



Typical clinical situations in which monitoring of disease activity is useful

Acute flare:

- Improvement vs. non-improvement on therapy (*why continue therapies without knowing whether they are effective?)*

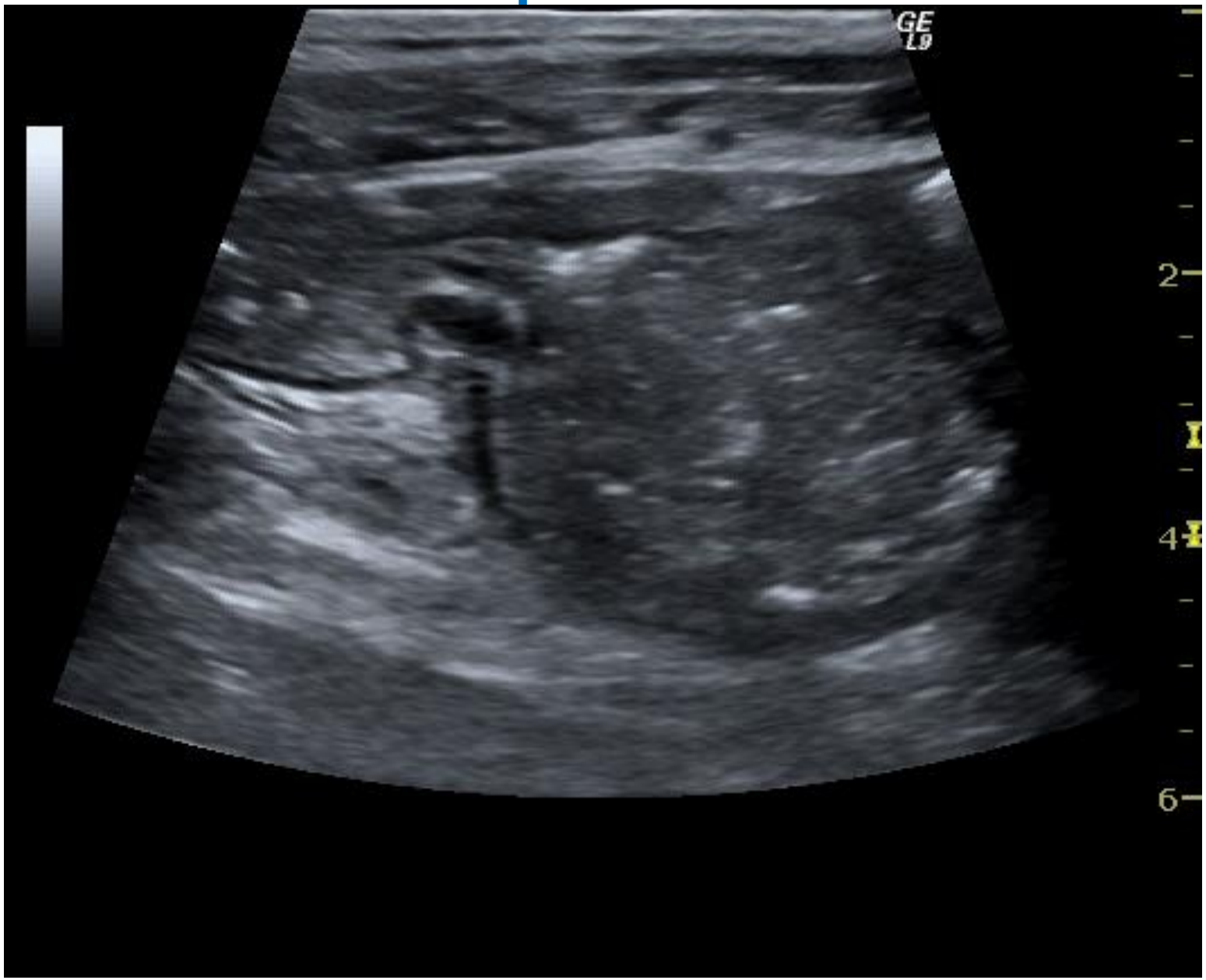
Chronic activity:

- Intensify e.g. 2 - 2.4 g 5-ASA to 3 - 4.8 g
- Switch to different mode of action
- Augment: Adding AZA to 5-ASA or adding biologics to immunomodulators

Remission:

- Symptom-free versus mucosal healing (*check when & how*)
- Residual symptoms
- Change/increase of symptoms or lab values (*preventive treatment to avoid a flare?*)

Prestenotic dilatation in CD patient



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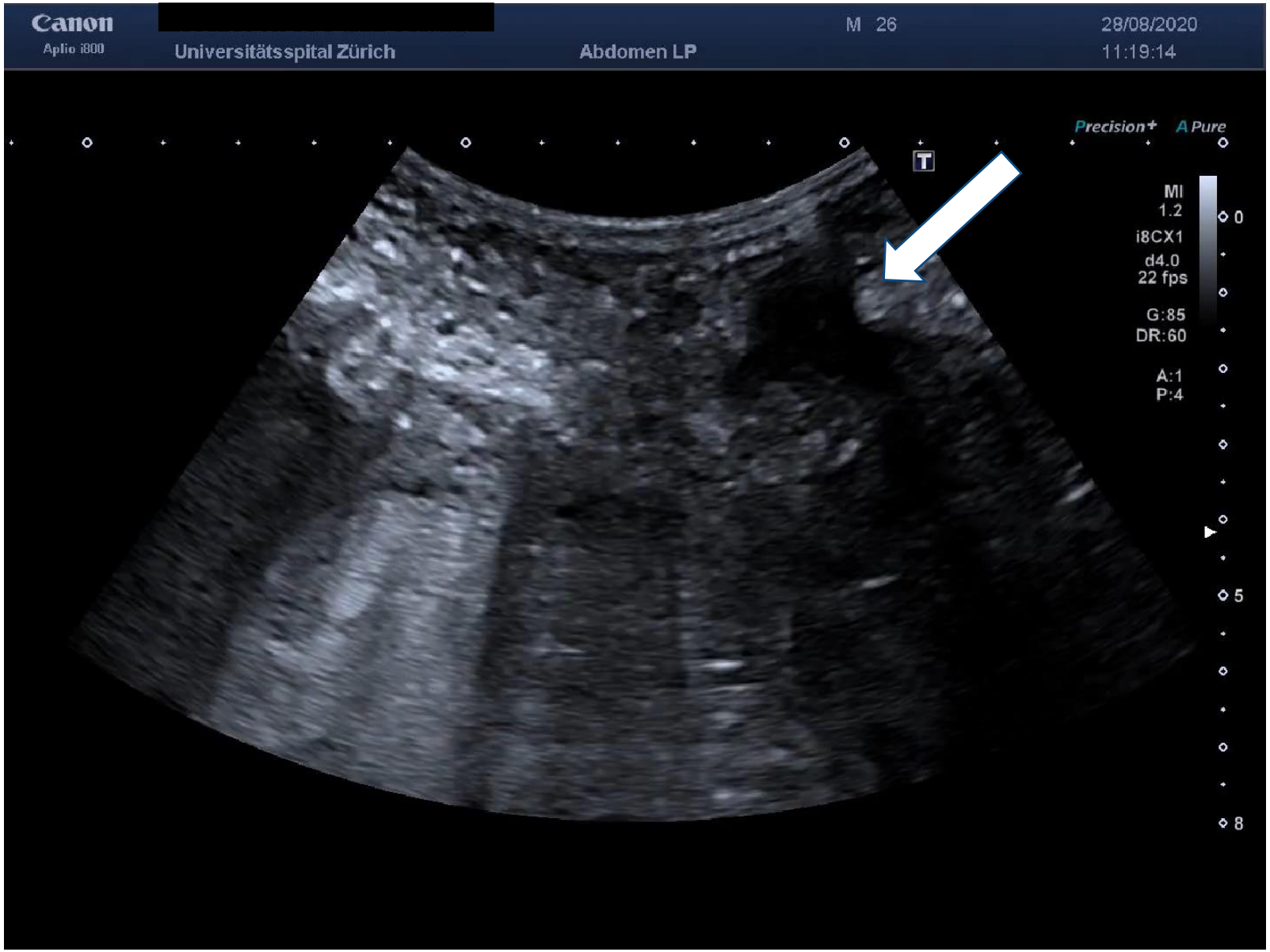
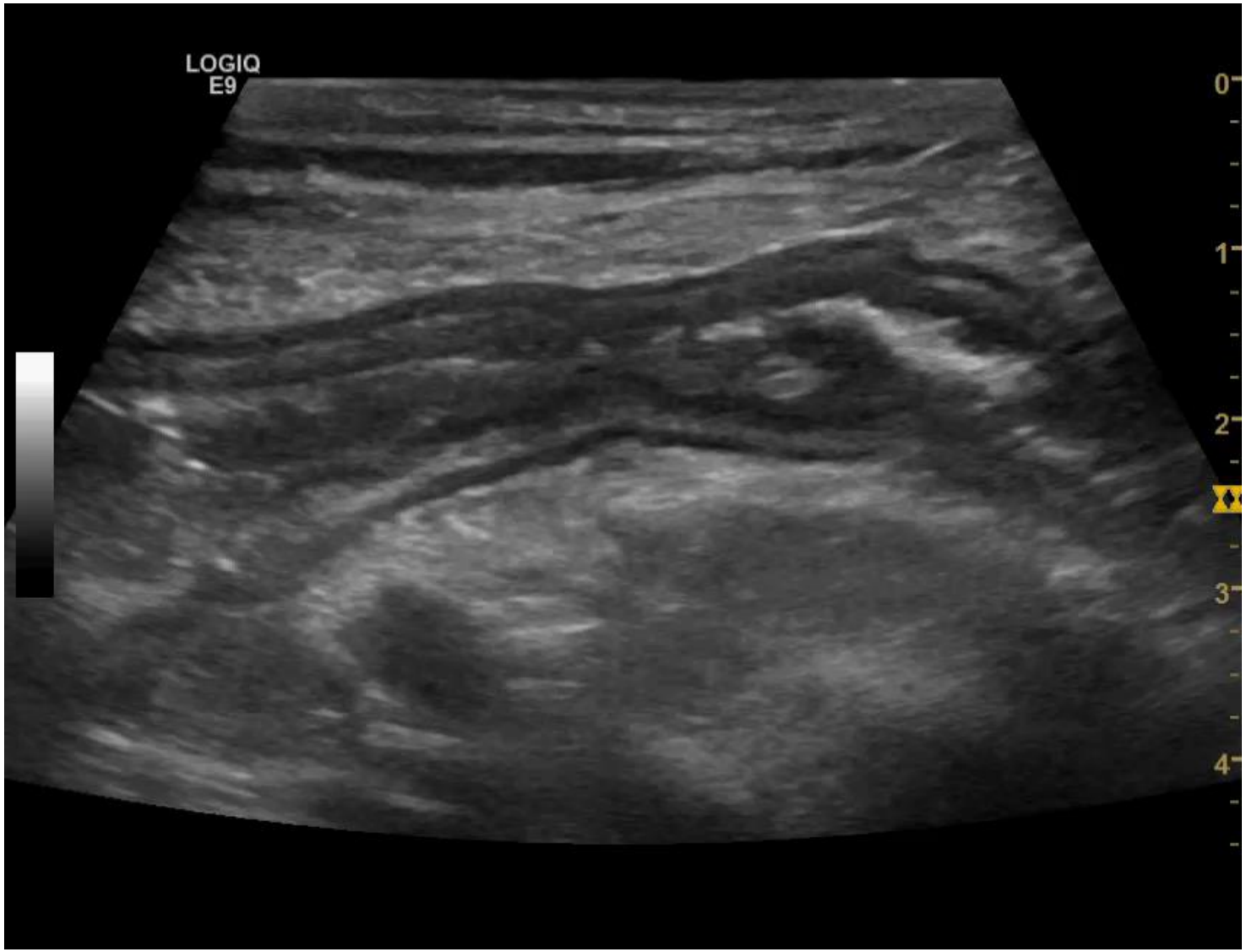
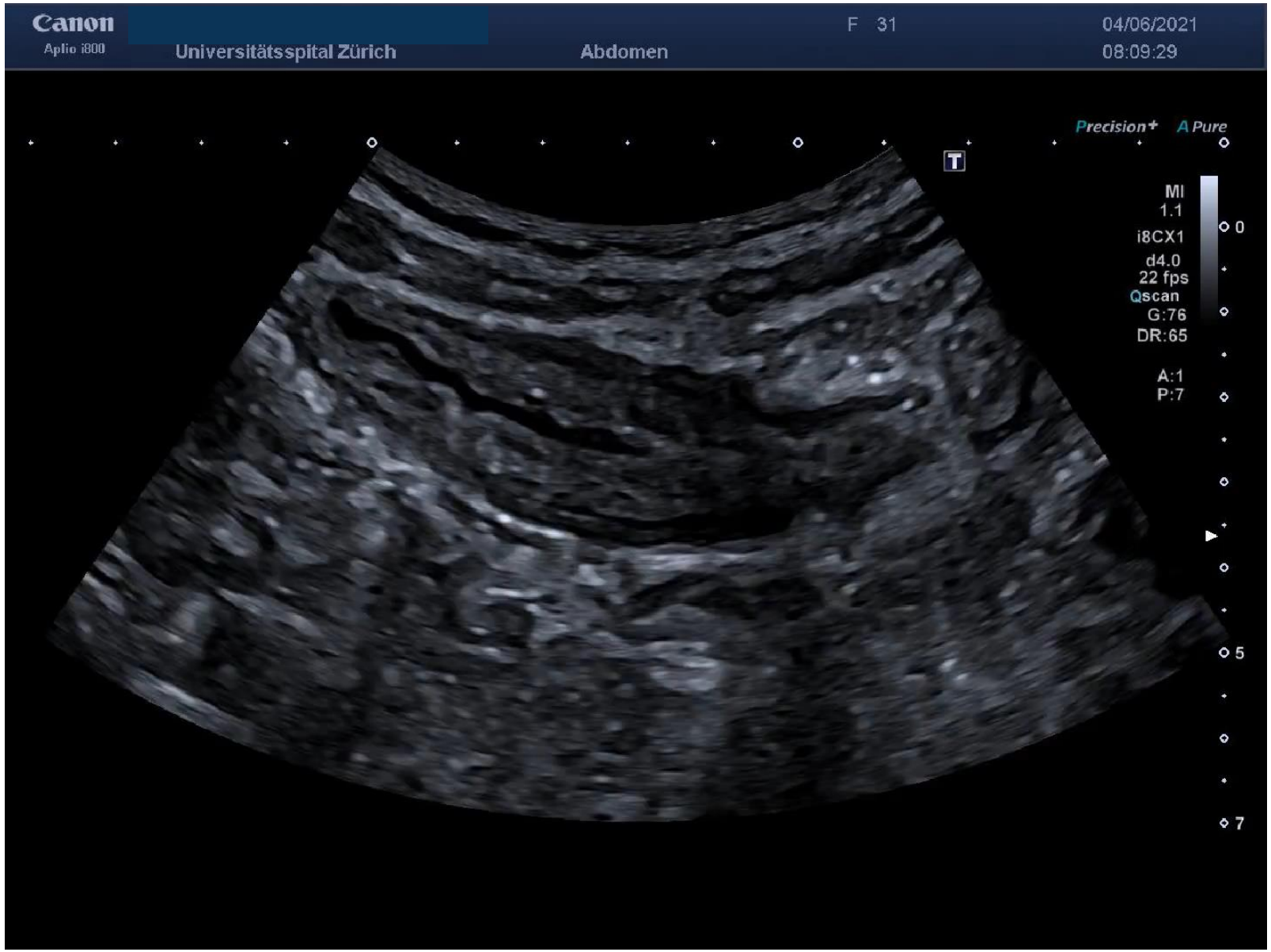
Crohn’s disease wih fistula



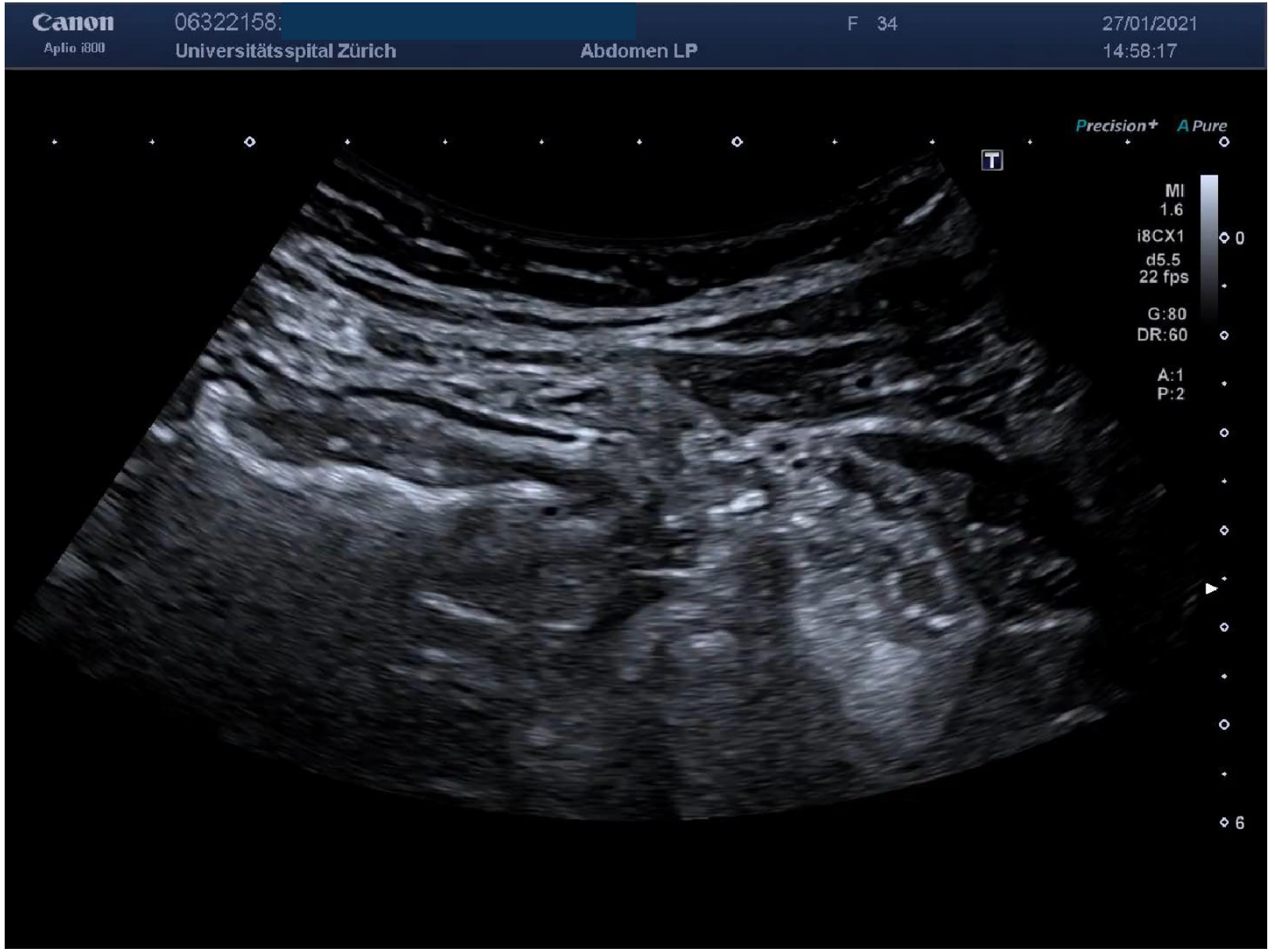
Active UC



Female patient (32y) with Crohn’s disease



Female patient (35y) with left sided colitis



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Intestinal US is a useful tool for diagnosing and monitoring IBD as well as other intestinal inflammatory diseases

- Initial diagnosis/manifestation of IBD
- Monitor therapeutic success
- IBD recurrence
- Abscess formation, ascites, fistulas
- Extraintestinal abdominal complications
- Diagnosis of various other intestinal diseases

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Thank you for your attention