international bowel ULTRASOUND GROUP

Sharpening the eyes – image optimization

Frauke Petersen

Former lead of Ultrasound and General Internal Medicine-Gastroenterology, Department,
Municipal Hospital of Lüneburg
Lüneburg, Germany

Berlin, DE – October 2nd – 3rd, 2025

Disclosures

- I accepted workshop training support from

- MSD
- Janssen
- Takeda

- I have no financial relationsship with ultrasound companies

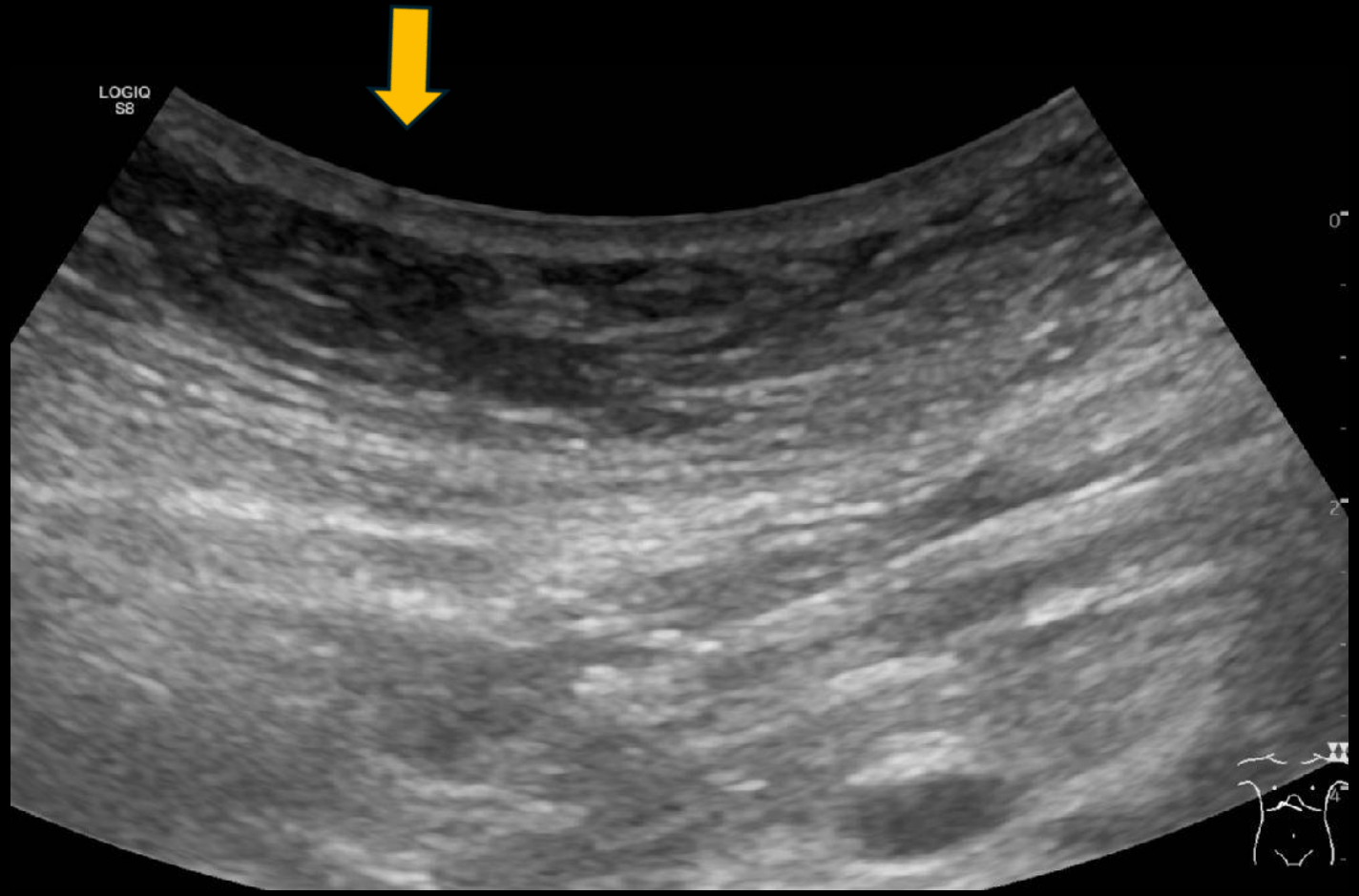
international bowel ULTRASOUND GROUP

Part 1 Image acquisition

- Avoiding shadows
- The good pressure
- The good position
- Centering
- Helpful shadows

international bowel
ULTRASOUND GROUP

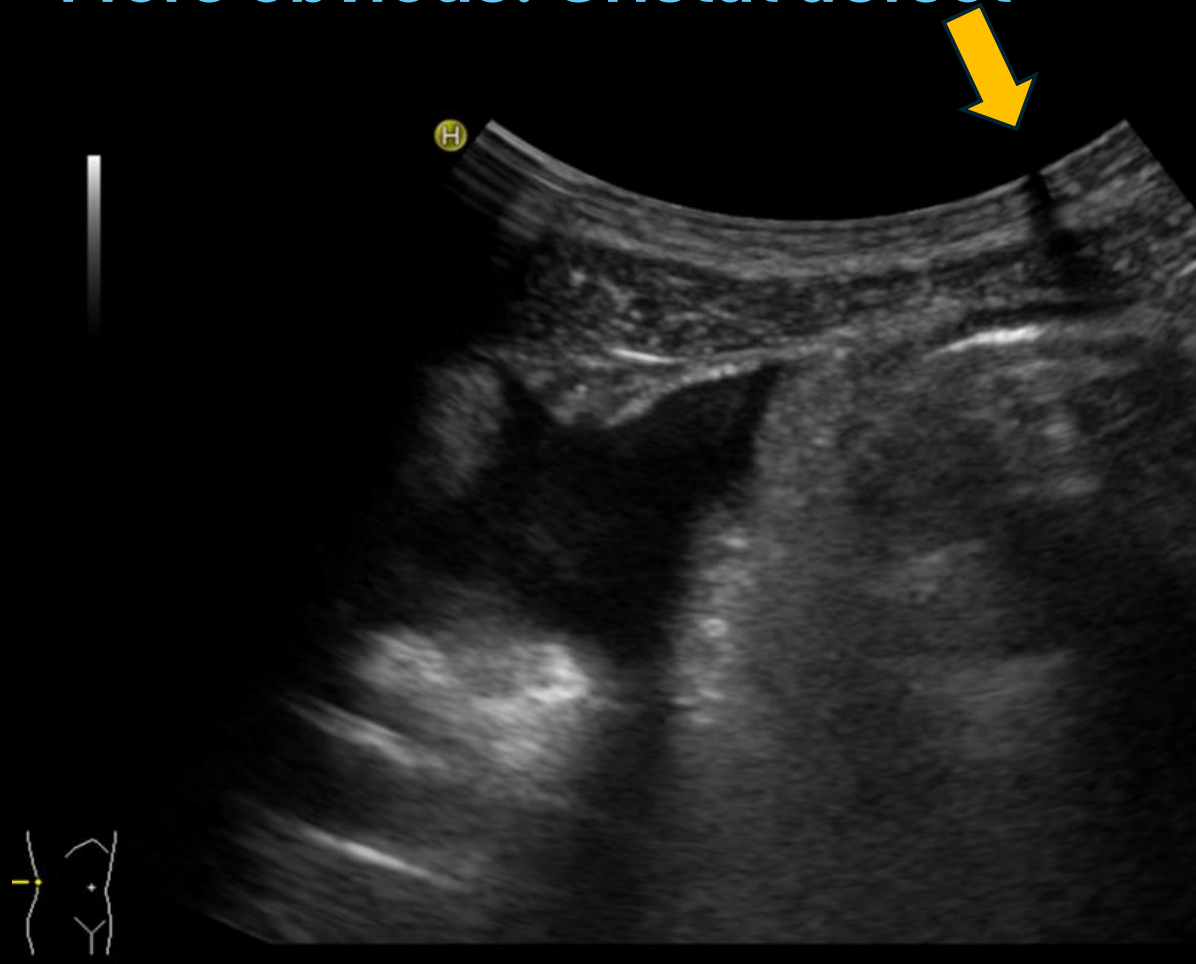
What is wrong with this image?



Dr. Frauke Petersen

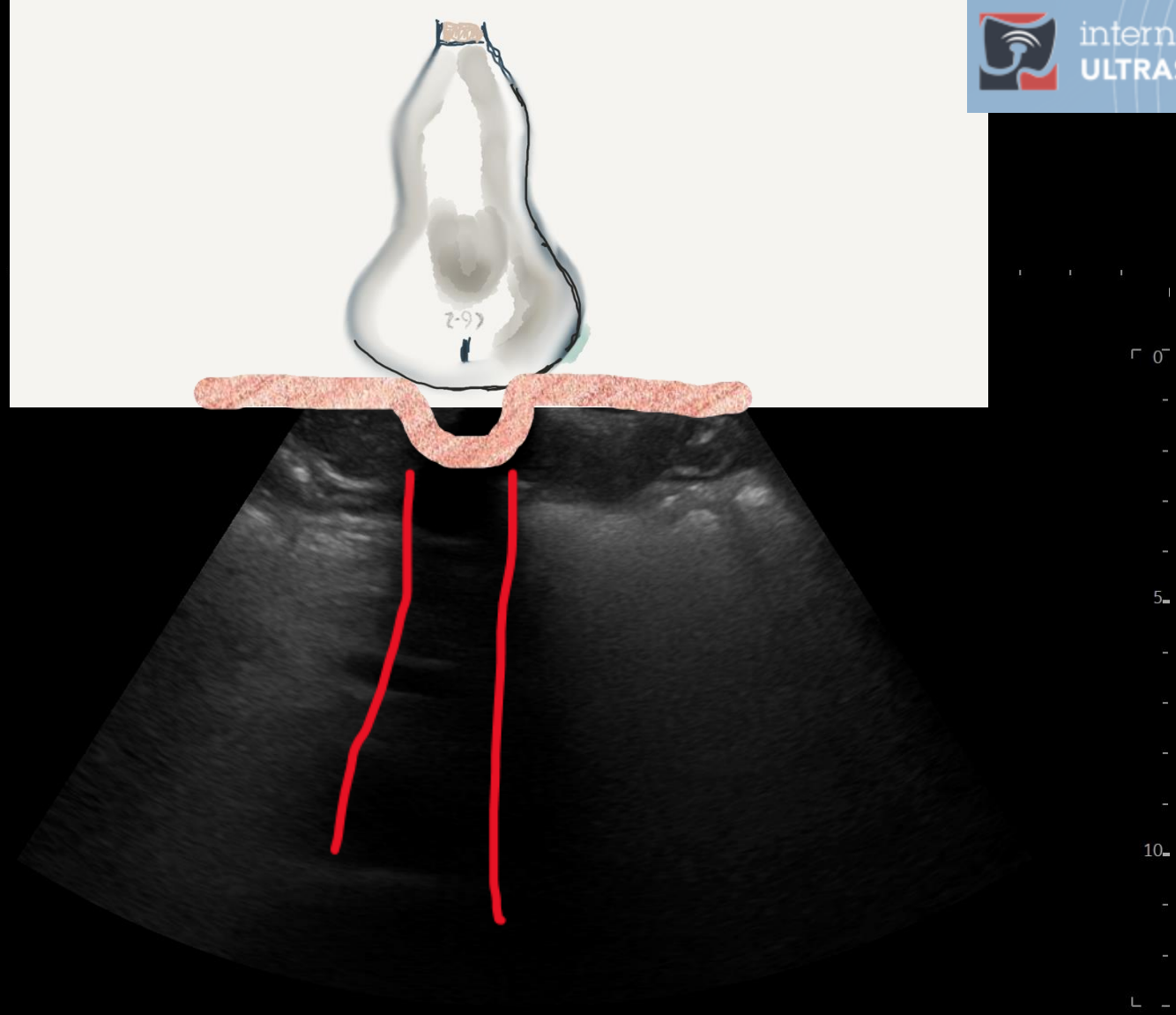
international bowel
ULTRASOUND GROUP

More obvious: Cristal defect

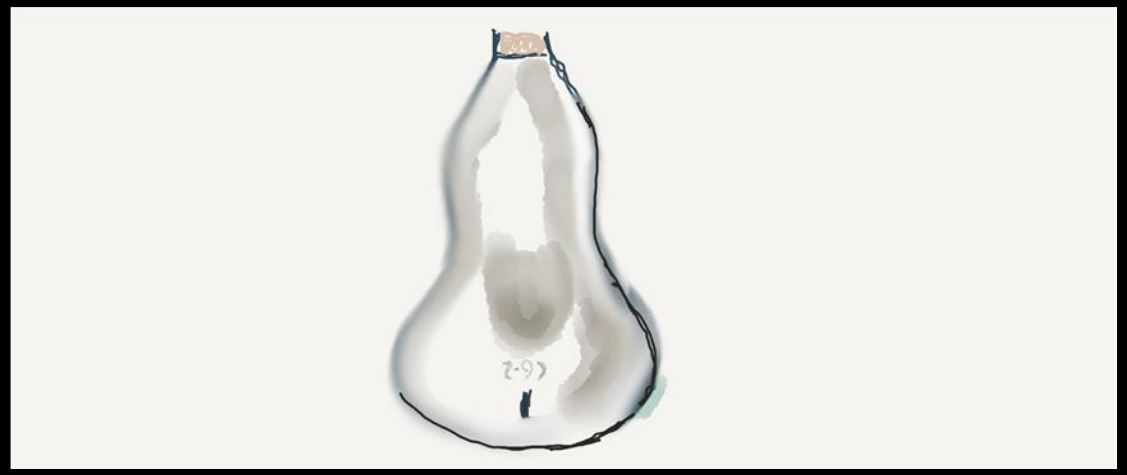


Dr. Frauke Petersen

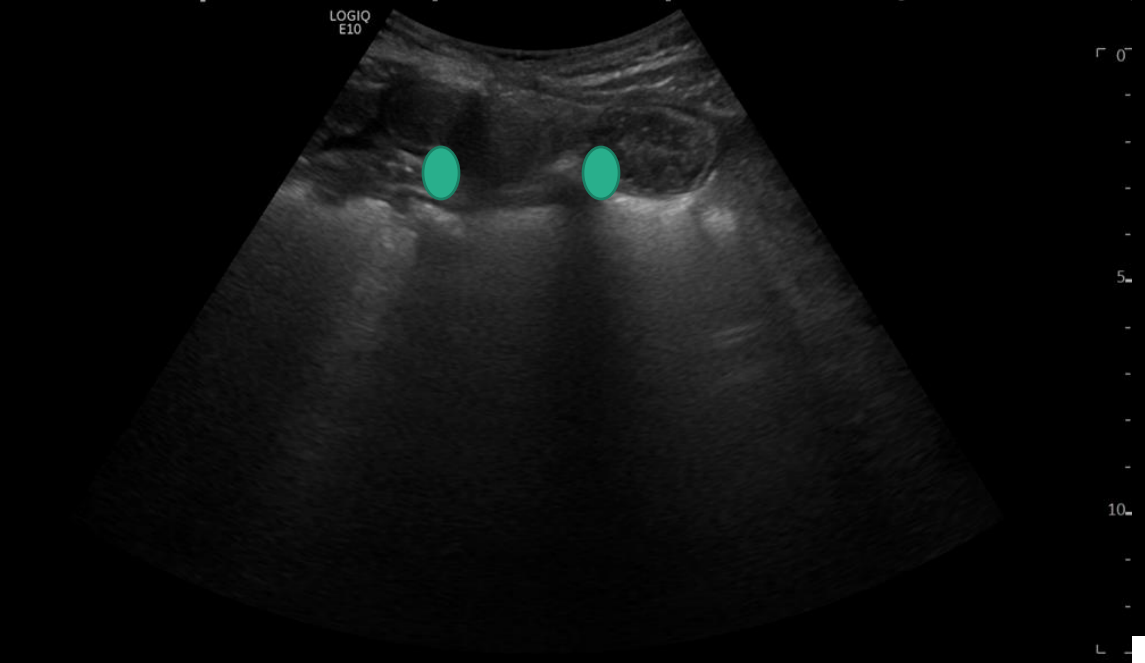
Air shadowing



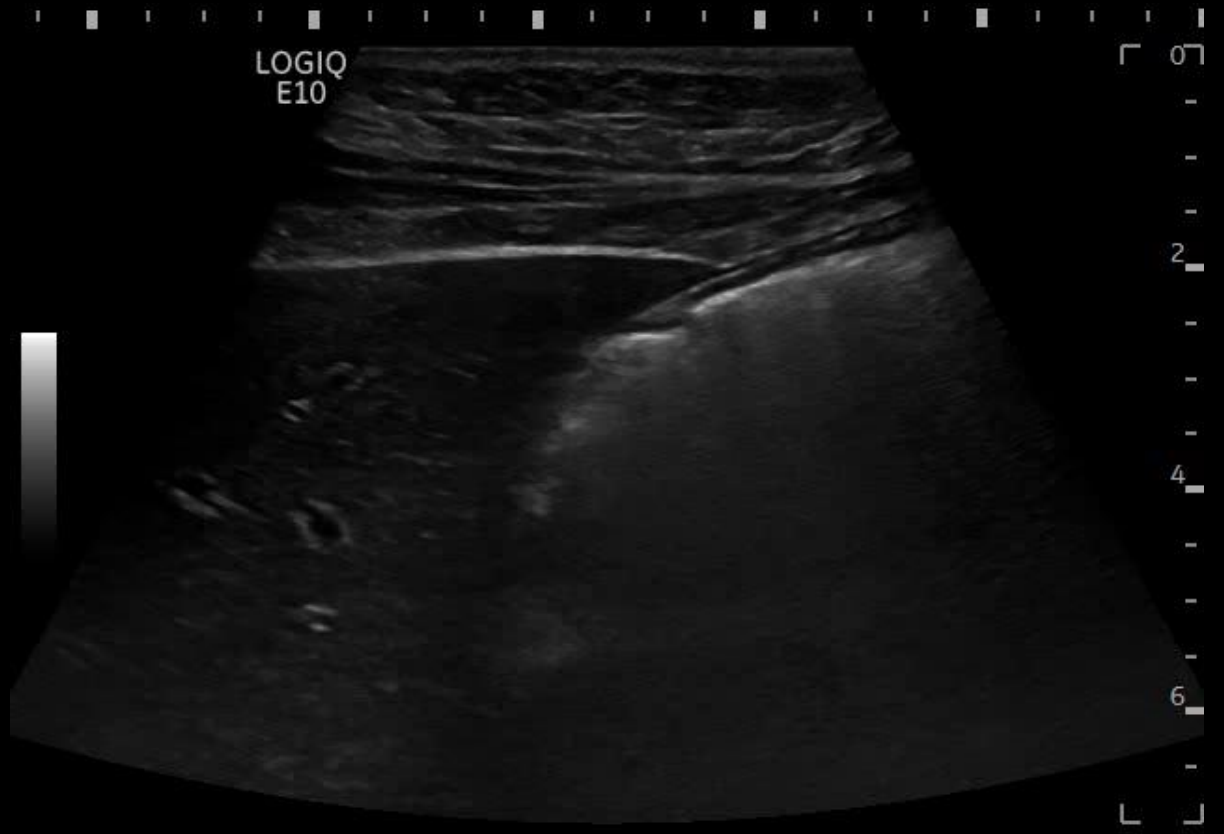
Dr. Frauke Petersen



06/04/22
LOGIQ
E10
0
5
10


06/04/22
LOGIQ
E10
0
5
10

Tiny disturbances :outer shadowing



Dr. Frauke Petersen

Gel mixed with abdominal hair

Dr. Frauke Petersen

Reasons for „external“ shadows

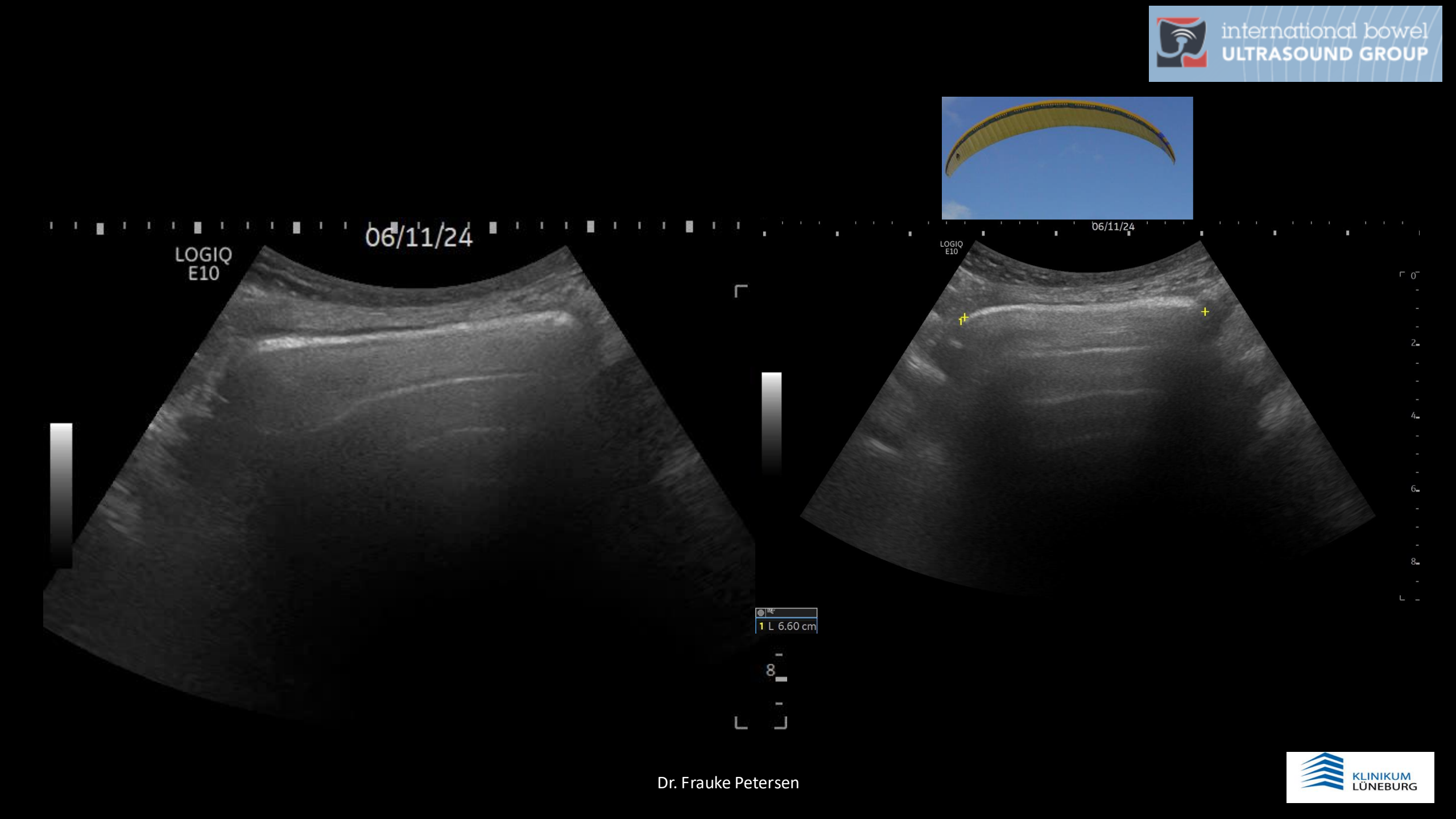
- Transducer detached, body „ valleys“, f.e. navel

- Tissue
- Dressings

- Bone/ ribs

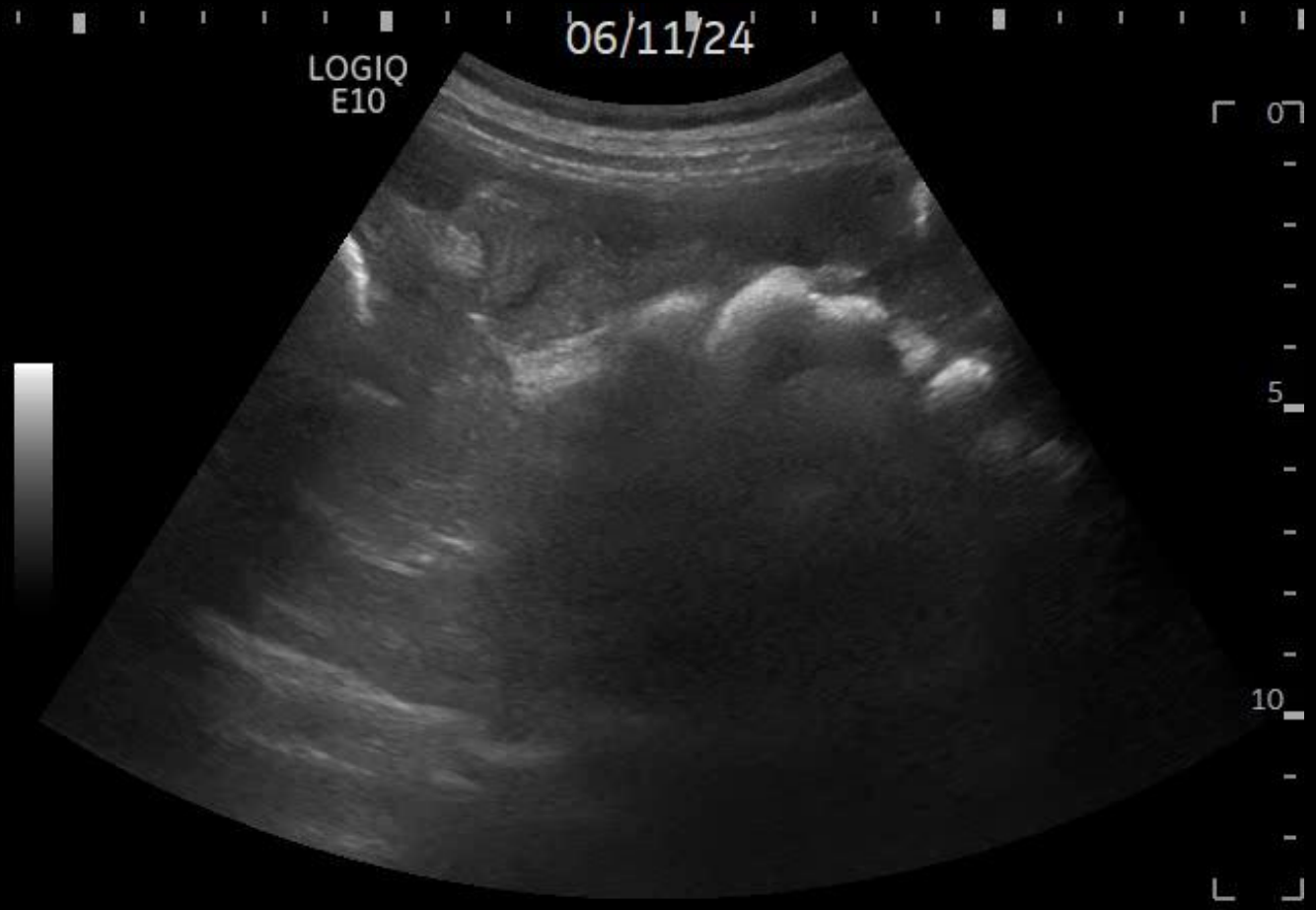
Air shadowing, ring-down artefacts

Dr. Frauke Petersen


international bowel
ULTRASOUND GROUP
06/11/24
LOGIQ
E10
06/11/24
LOGIQ
E10
1 L 6.60 cm
Dr. Frauke Petersen
KLINIKUM
LÜNEBURG

international bowel
ULTRASOUND GROUP

Undercutting the air in a lateral position


LOGIQ
E10
06/11/24
0
5
10

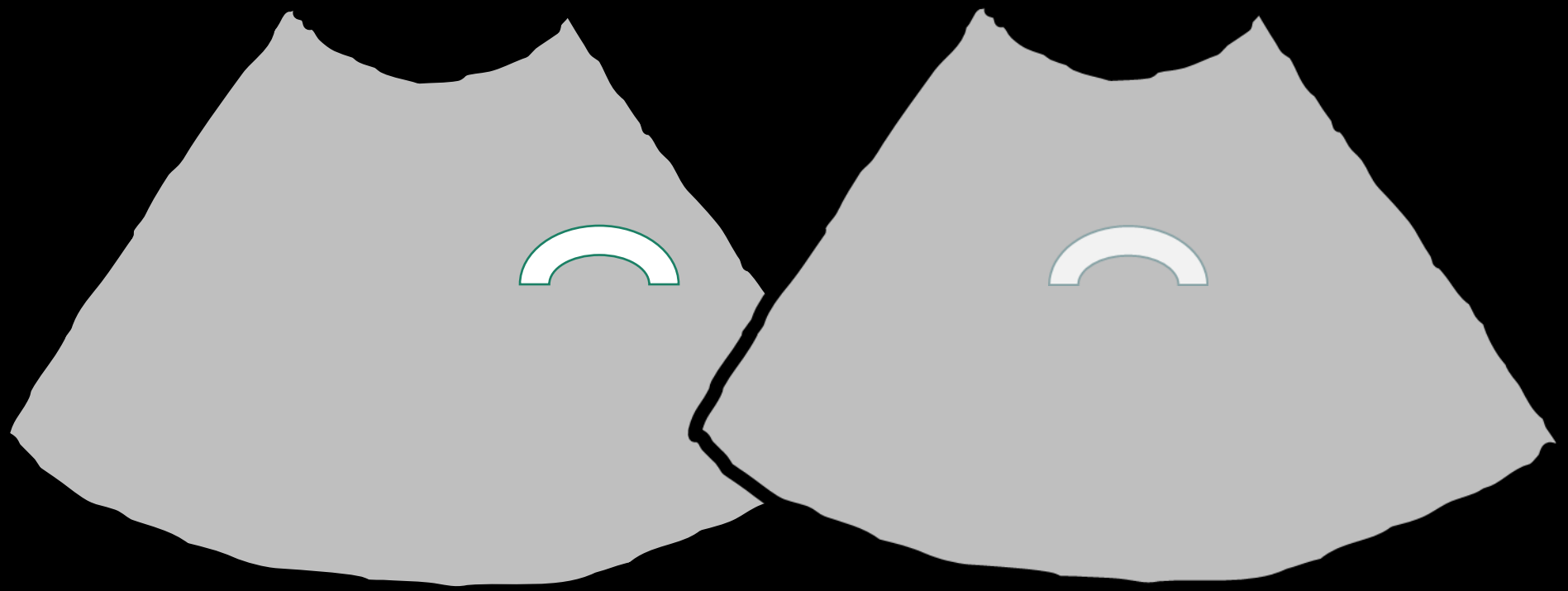
How to deal with obesitiy

Dr. Frauke Petersen

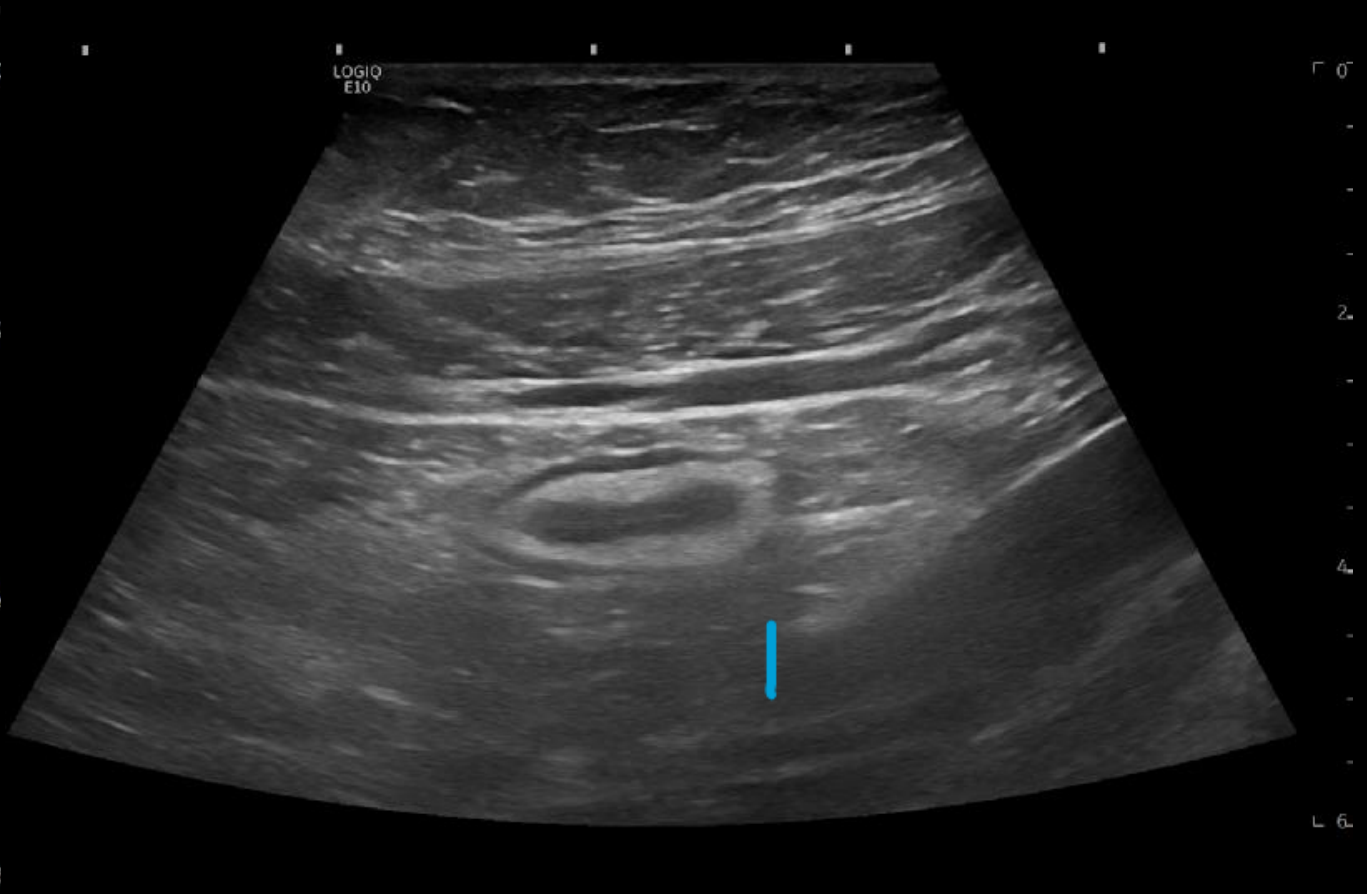
Centering

Dr. Frauke Petersen

Always place the intestine in the center of the image



KLINIKUM LÜNEBURG



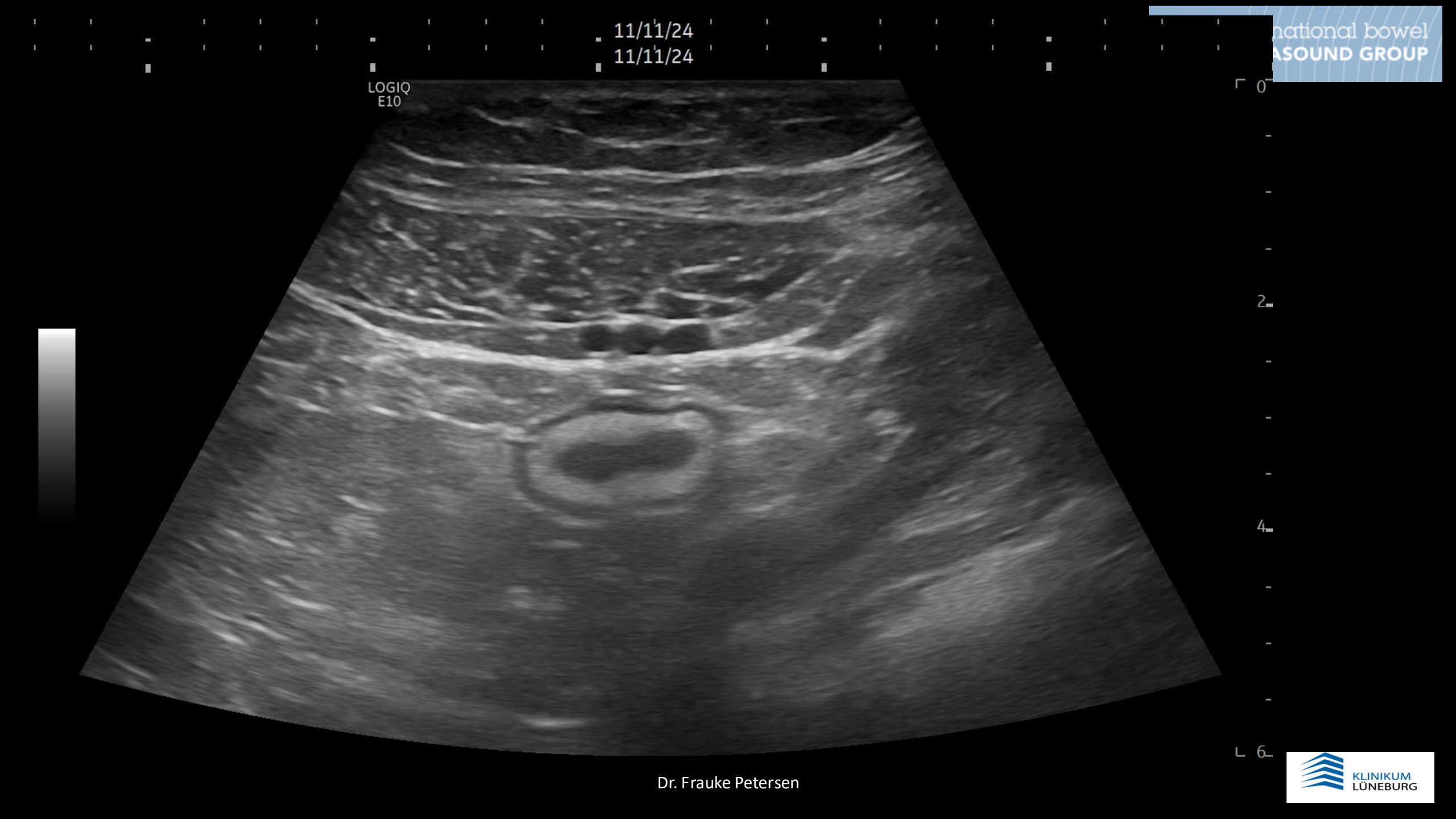
Dr. Frauke Petersen

international bowel ULTRASOUND GROUP

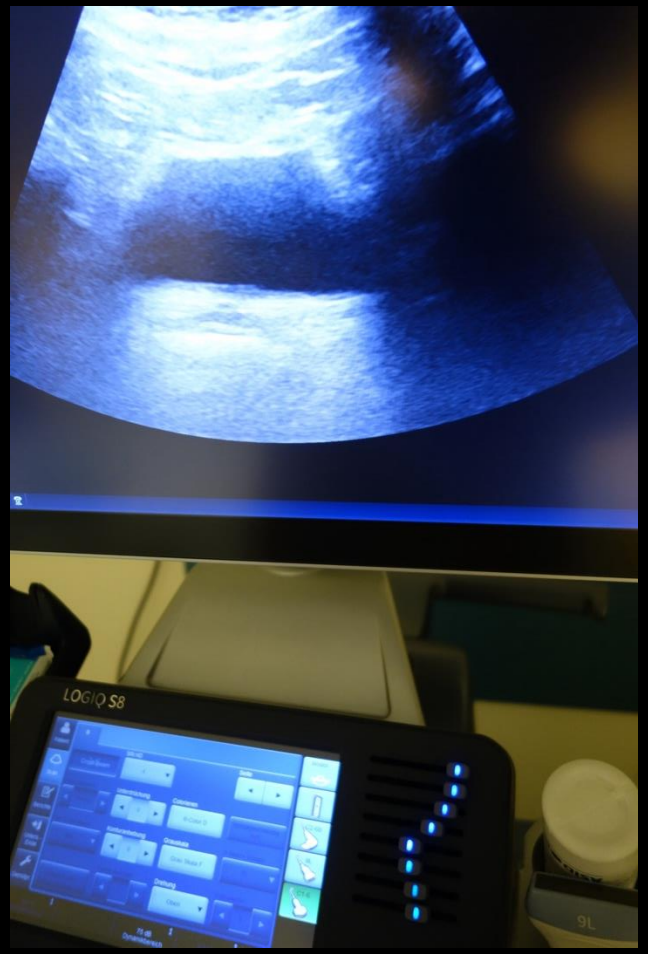
Part 2

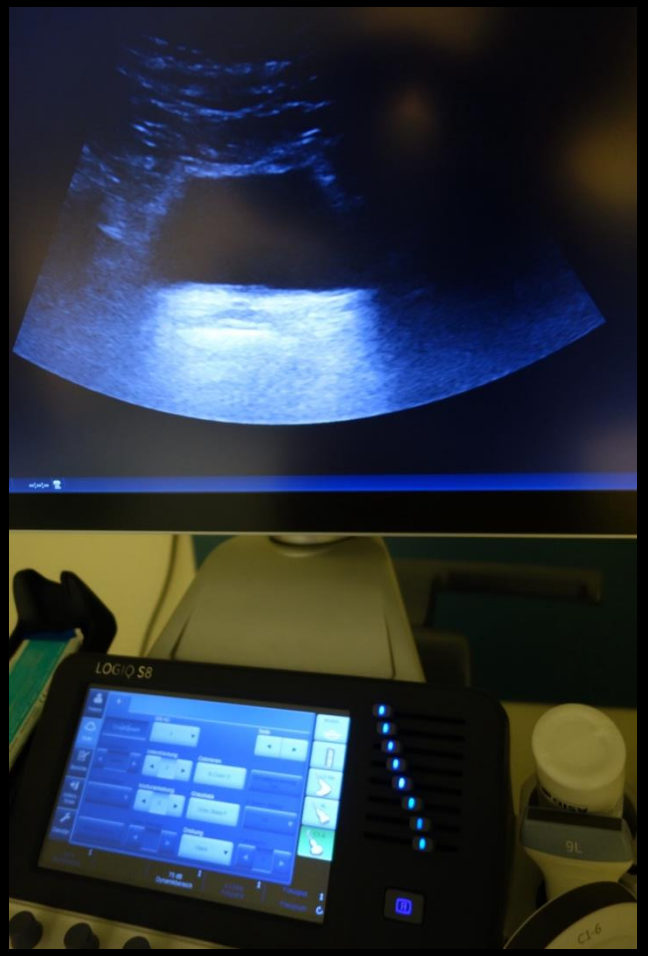
Image optimisation B-Mode

- The role of the gain
- The focus position
- Presets : the gray scale
- Presets: compounding and post-processing
- Presets: Dynamic range
- Zooming and enlarging tools


11/11/24
11/11/24
LOGIQ
E10
national bowel
ASOUND GROUP
0
2
4
6
Dr. Frauke Petersen
KLINIKUM
LÜNEBURG

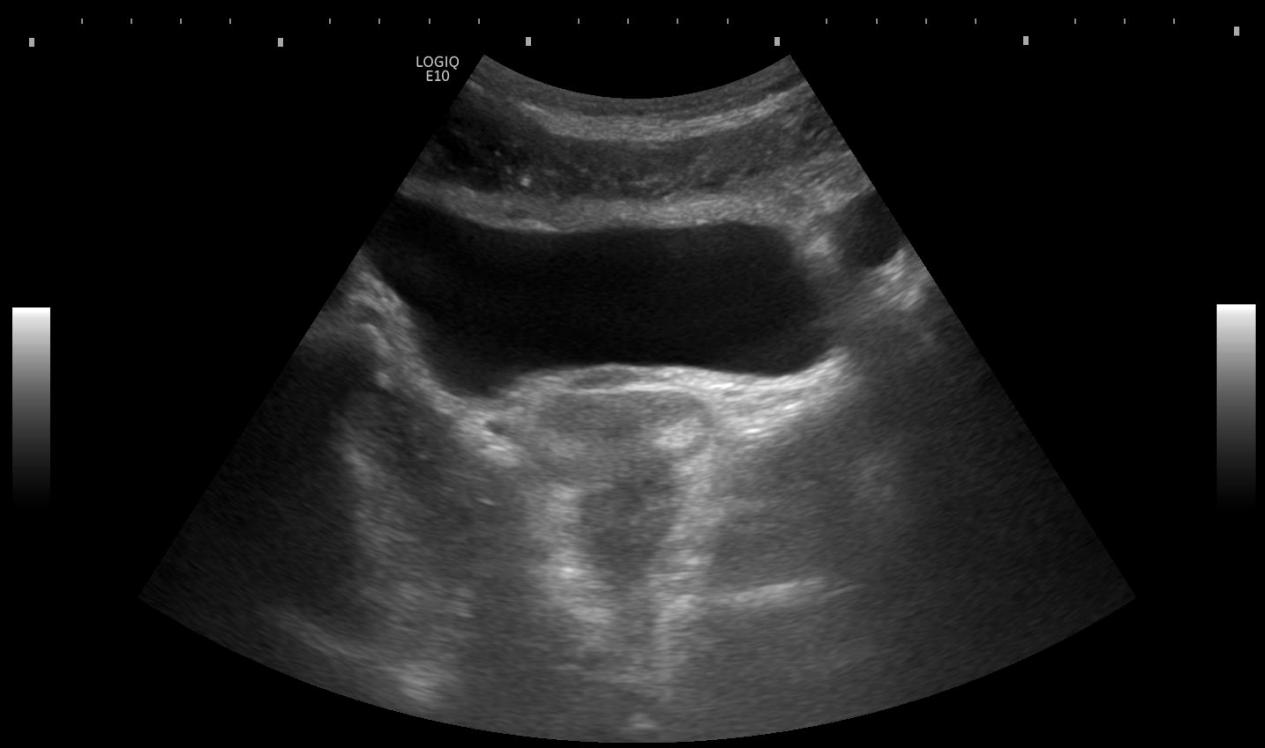
TGC (time gain compensation)

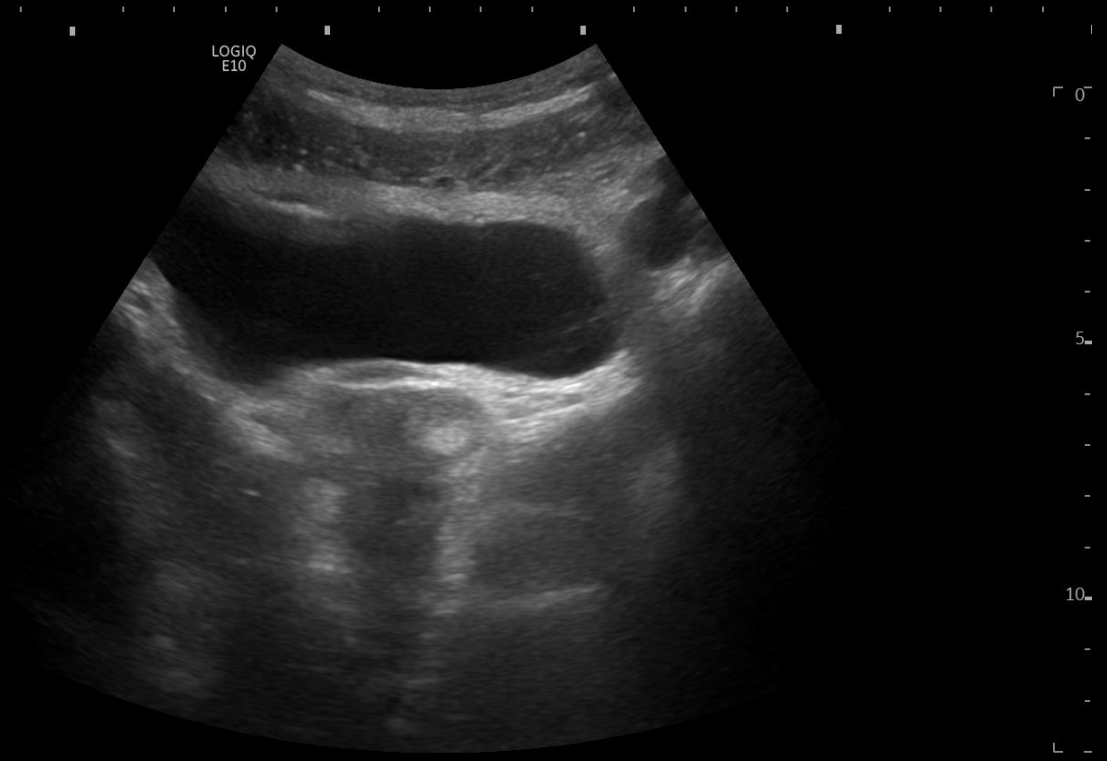




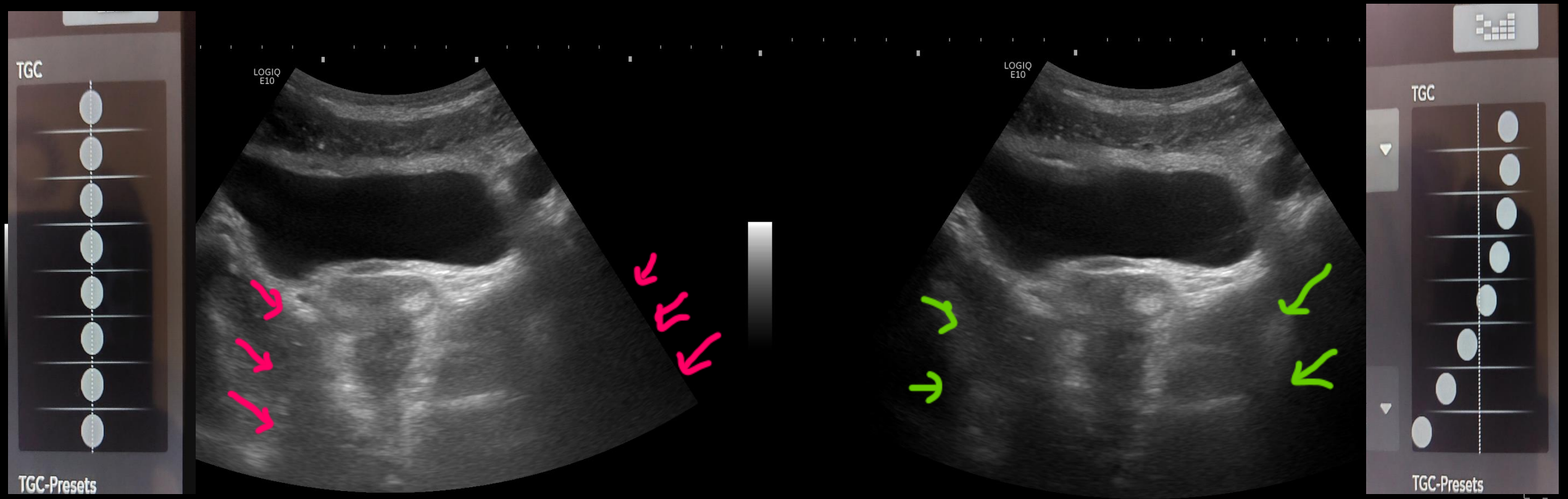
Dr. Frauke Petersen

KLINIKUM LÜNEBURG





Dr. Frauke Petersen



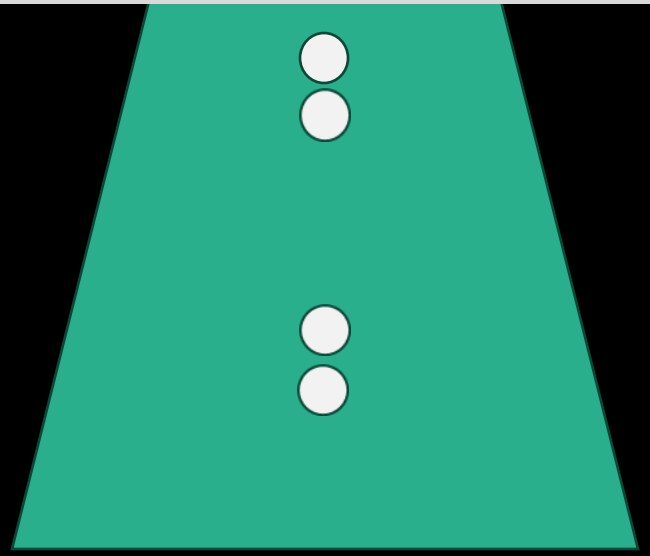
Dr. Frauke Petersen

The focus position

Axial Resolution

Depending on probe properties
Pulse length

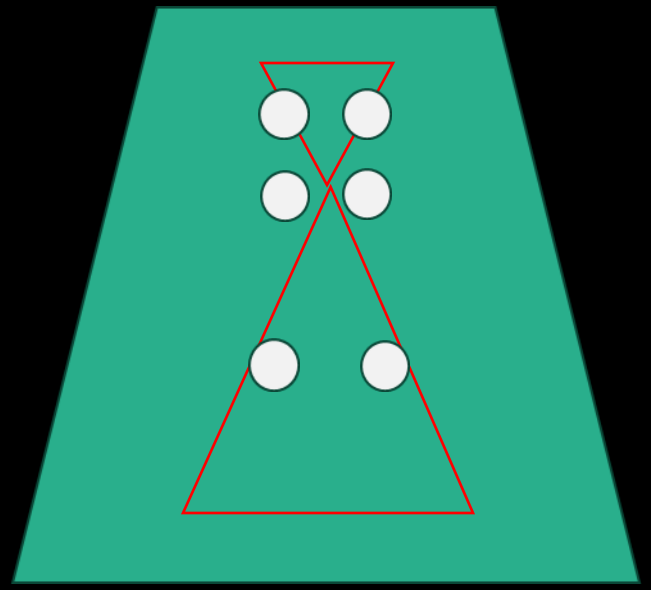
Independent of depth



Lateral resolution

Depending on focus position

Depth important

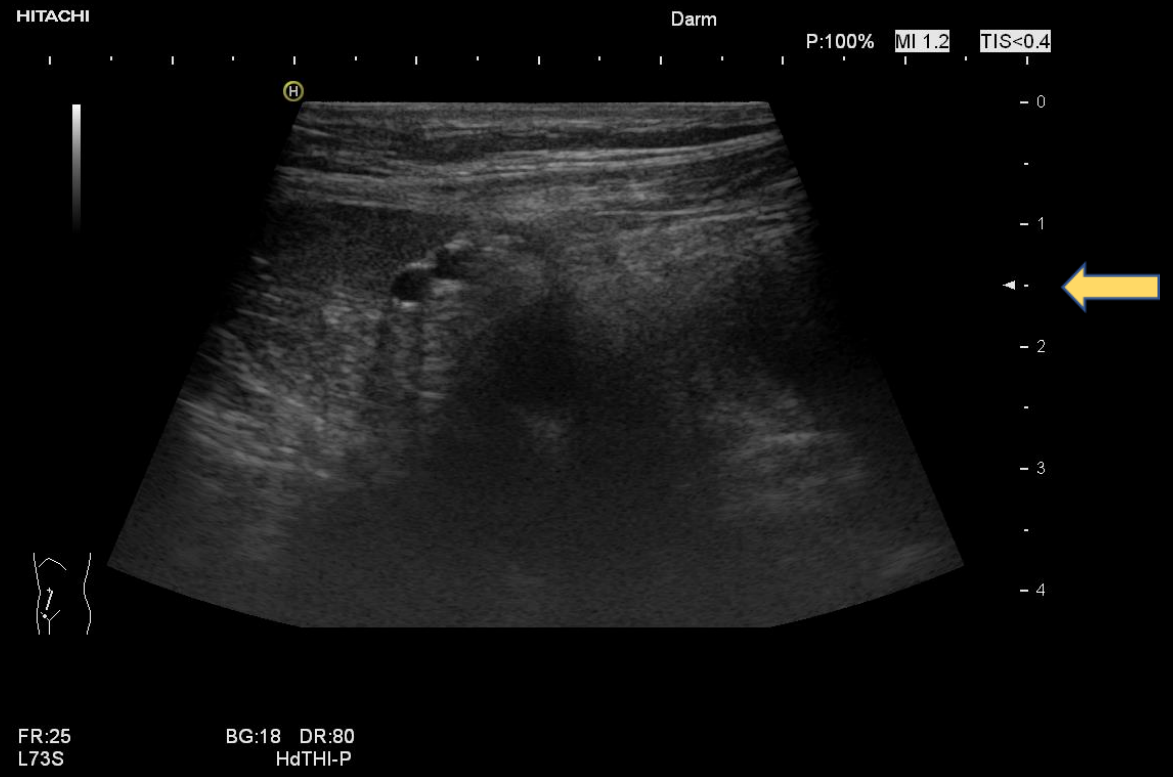


KLINIKUM LÜNEBURG

Dr. Frauke Petersen

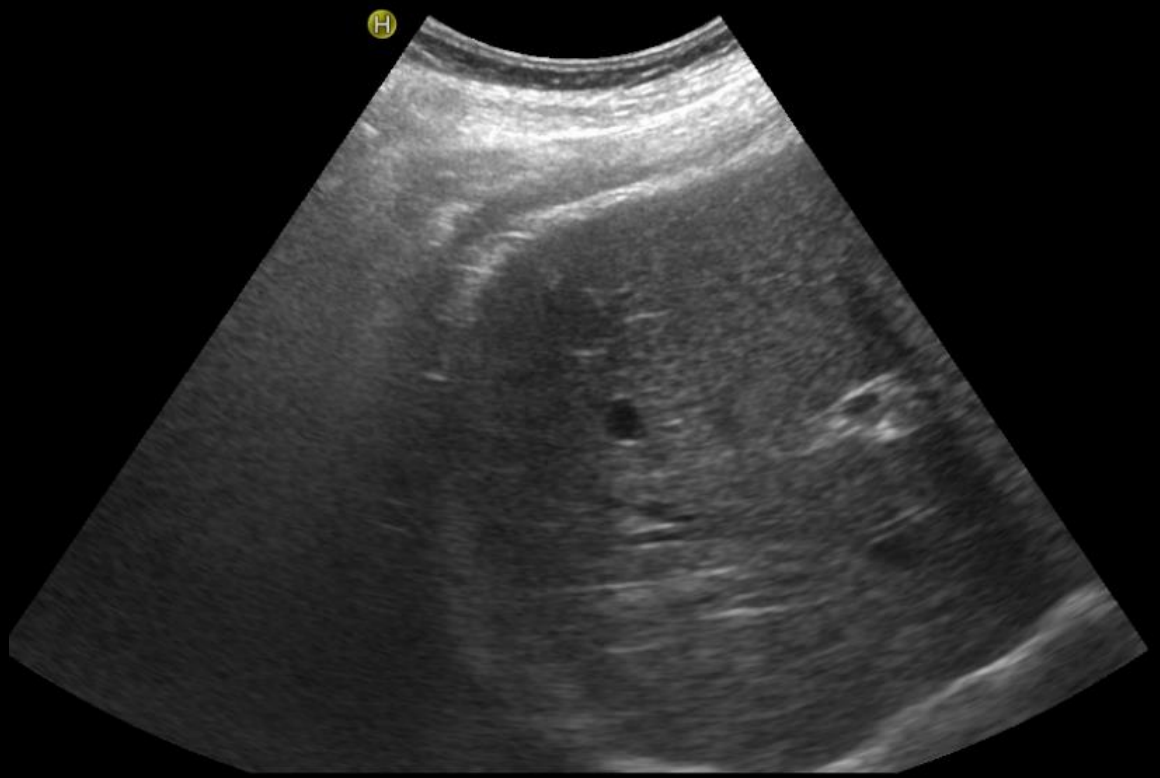
international bowel ULTRASOUND GROUP

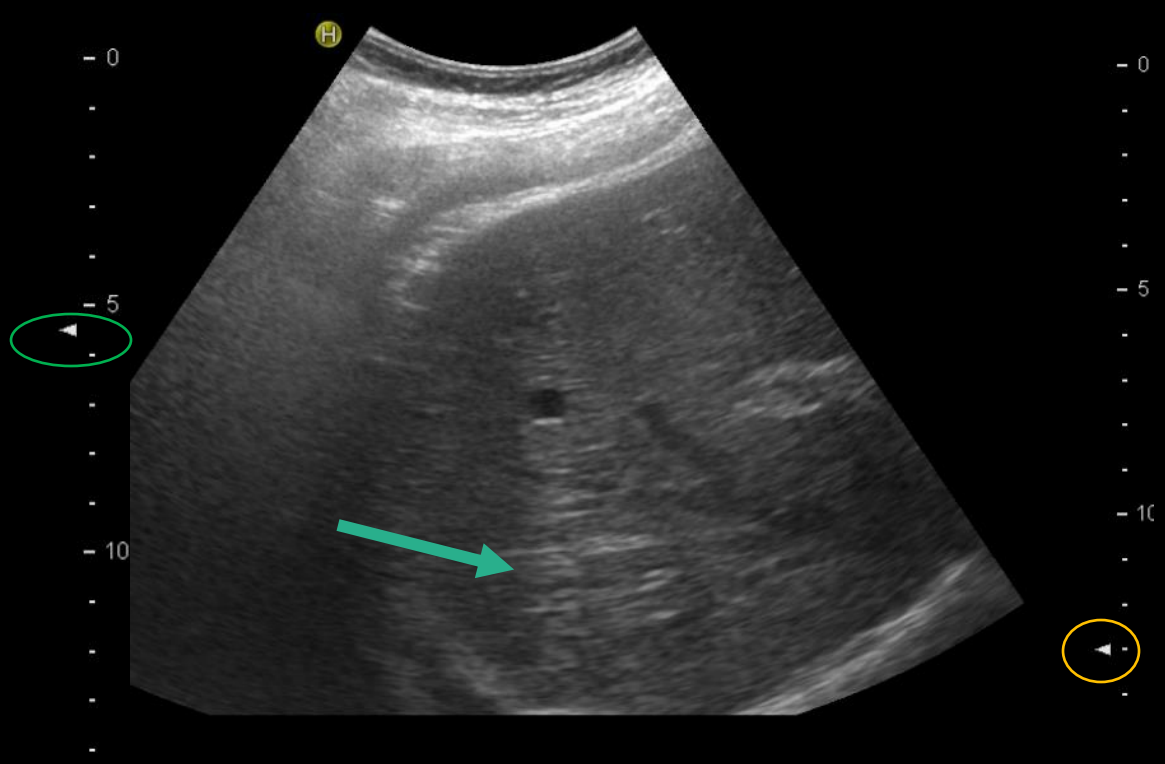
focus adjusted



Compare the aspect of the epigastric vessels in this image!

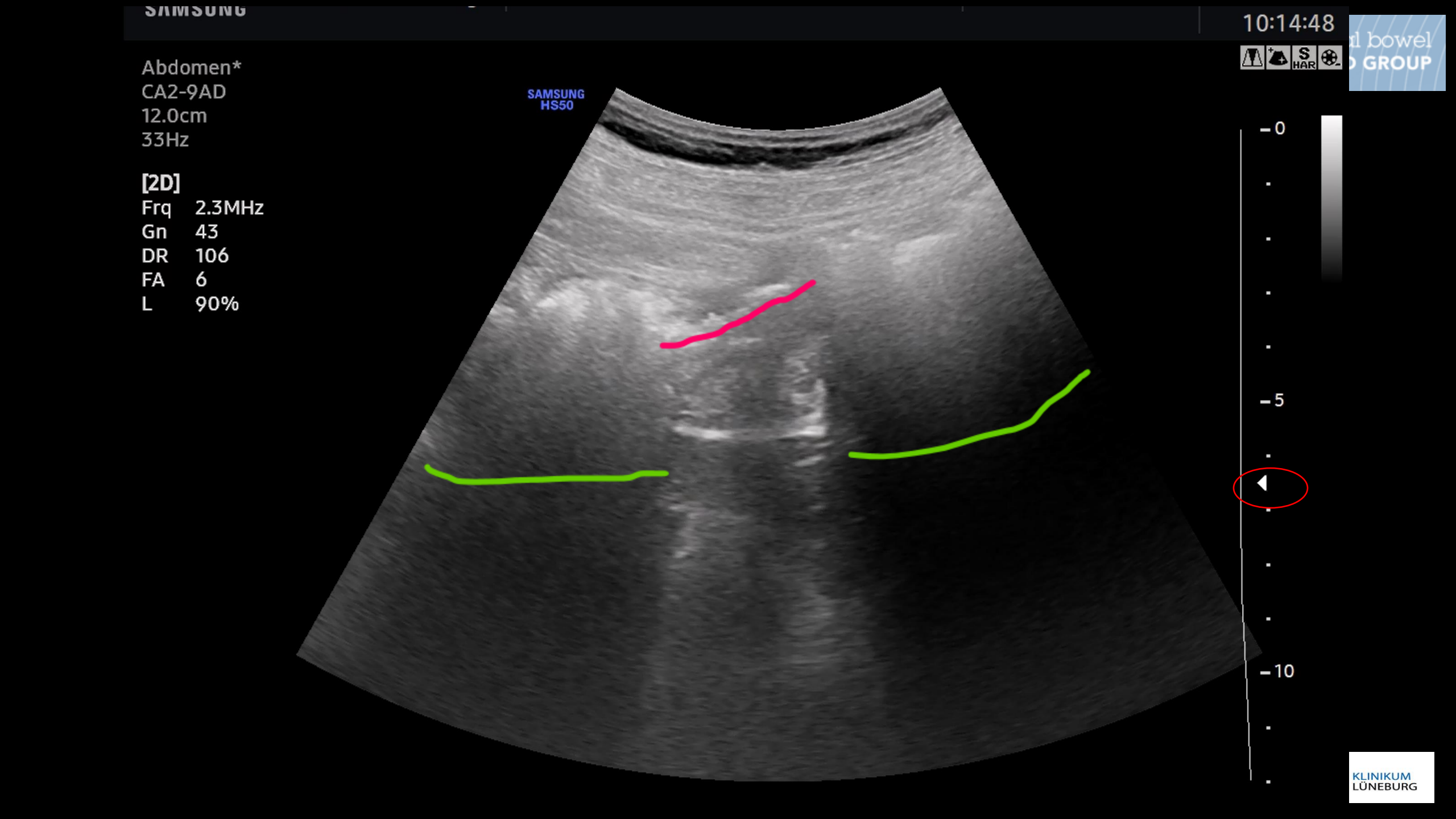
Focus position variation help to detect helpful shadows



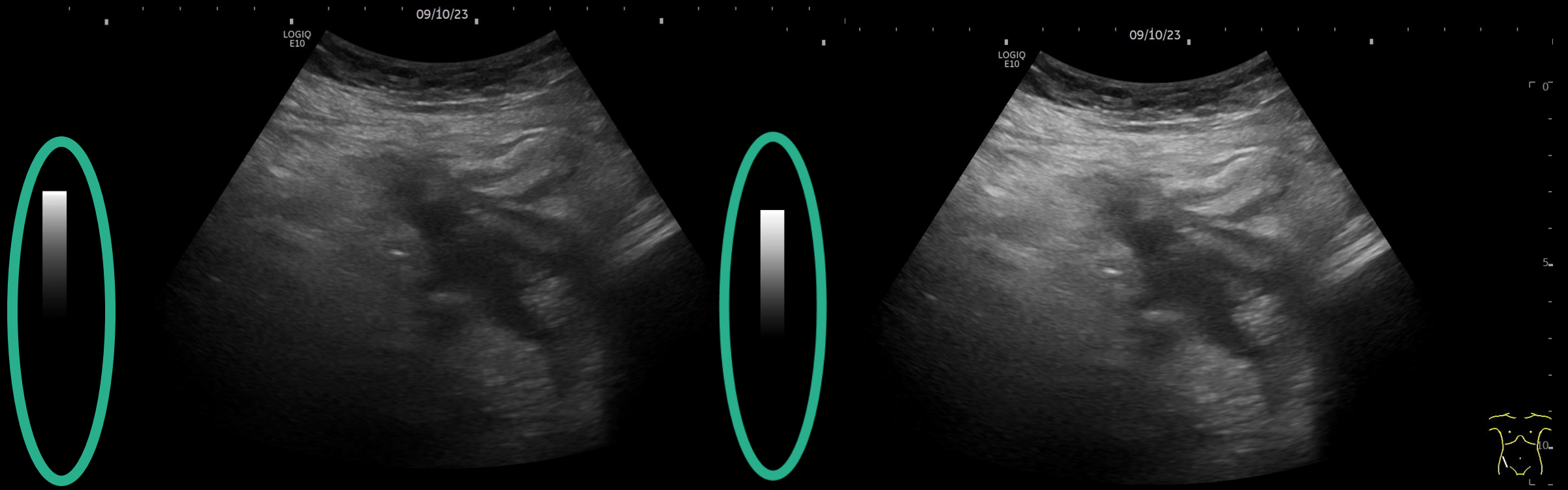


Dr. Frauke Petersen

KLINIKUM LÜNEBURG

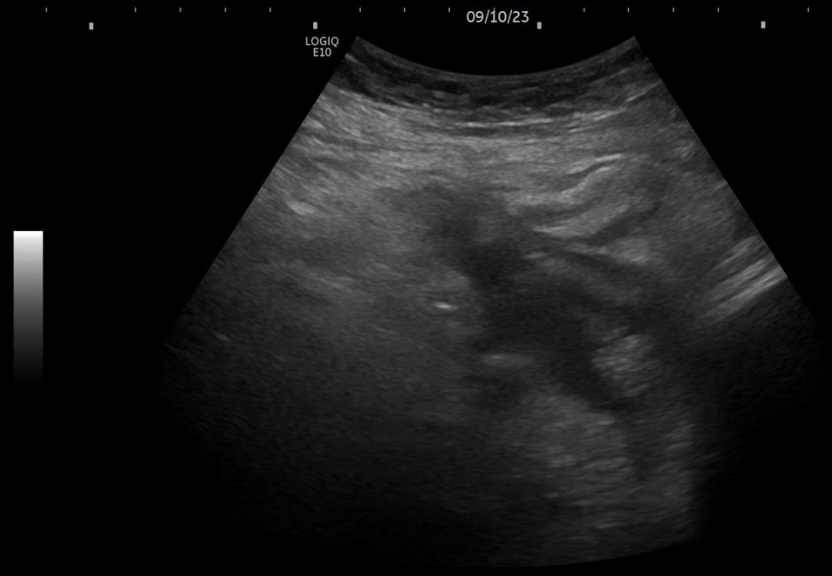

SAMSUNG
10:14:48
Abdomen*
CA2-9AD
12.0cm
33Hz
[2D]
Frq 2.3MHz
Gn 43
DR 106
FA 6
L 90%
SAMSUNG
HS50
0
5
10
KLINIKUM
LÜNEBURG

The grey scale



KLINIKUM LÜNEBURG

It has not to be gray!



Rods

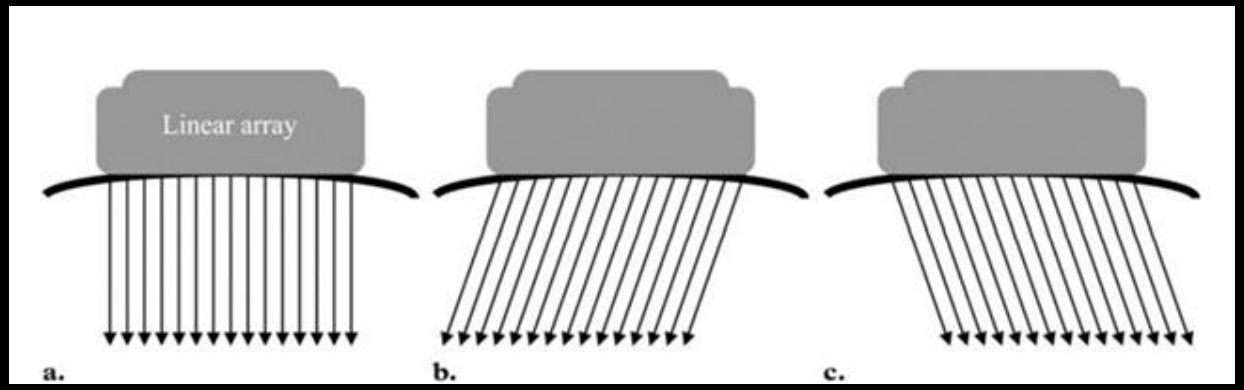
Cones

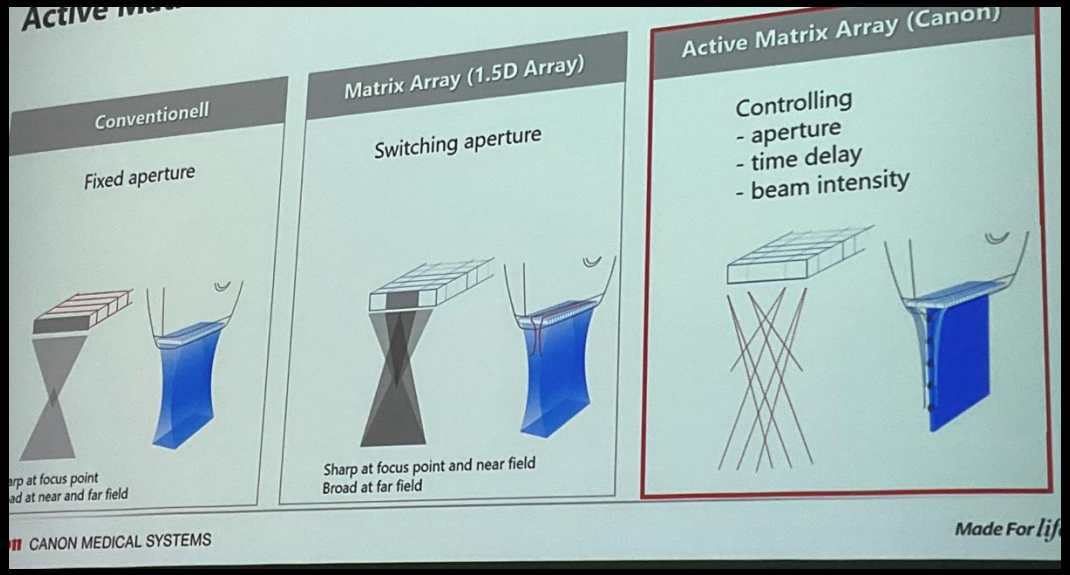
Compounding and post-processing: SRI

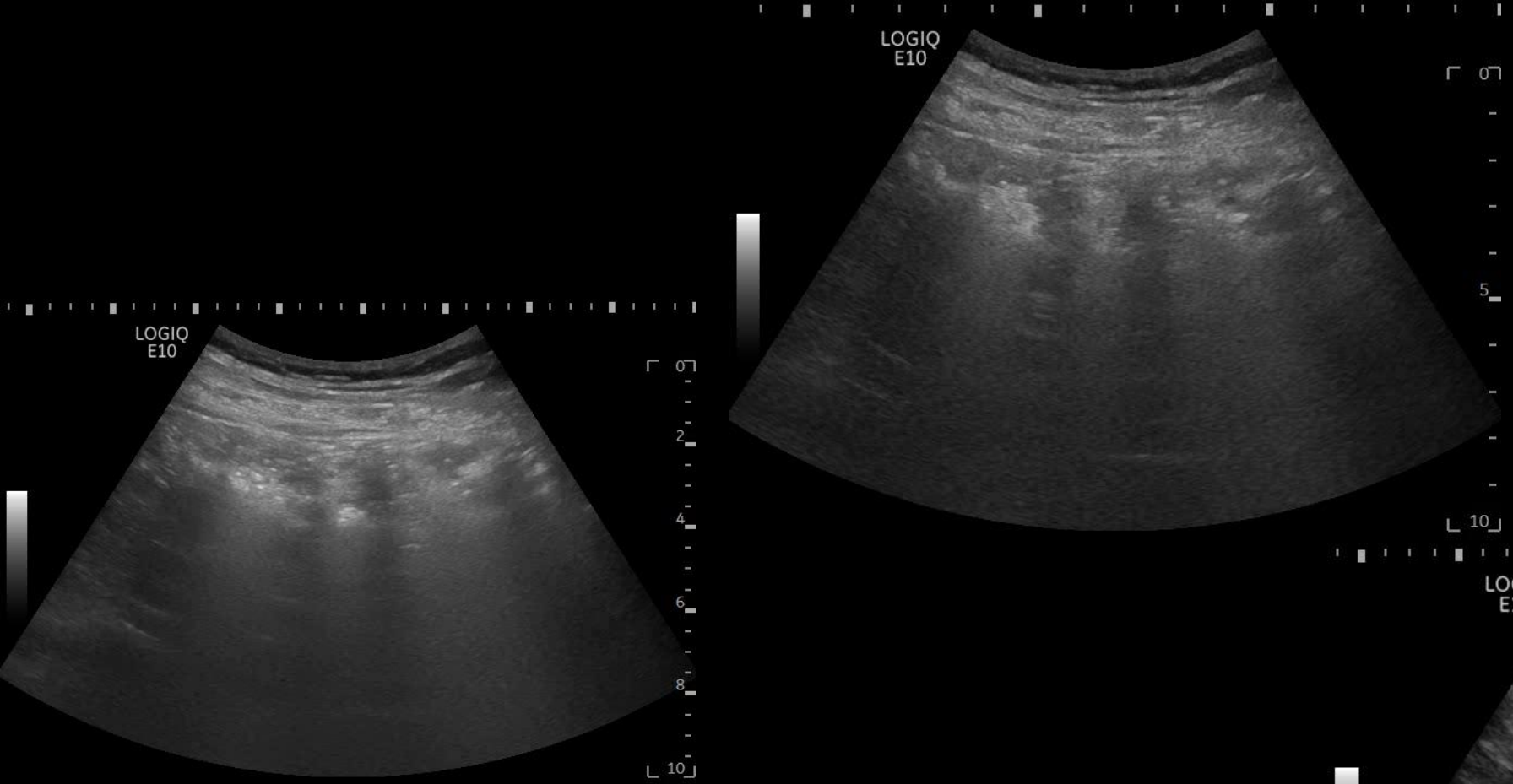
Dr. Frauke Petersen

It makes da difference what instrument you are playing

KLINIKUM LÜNEBURG


Linear array
a.
b.
c.


Conventionell
Fixed aperture
Matrix Array (1.5D Array)
Switching aperture
Sharp at focus point and near field
Broad at far field
Active Matrix Array (Canon)
Controlling
- aperture
- time delay
- beam intensity
CANON MEDICAL SYSTEMS



Playing the crossbeam button

Dr. Frauke Petersen

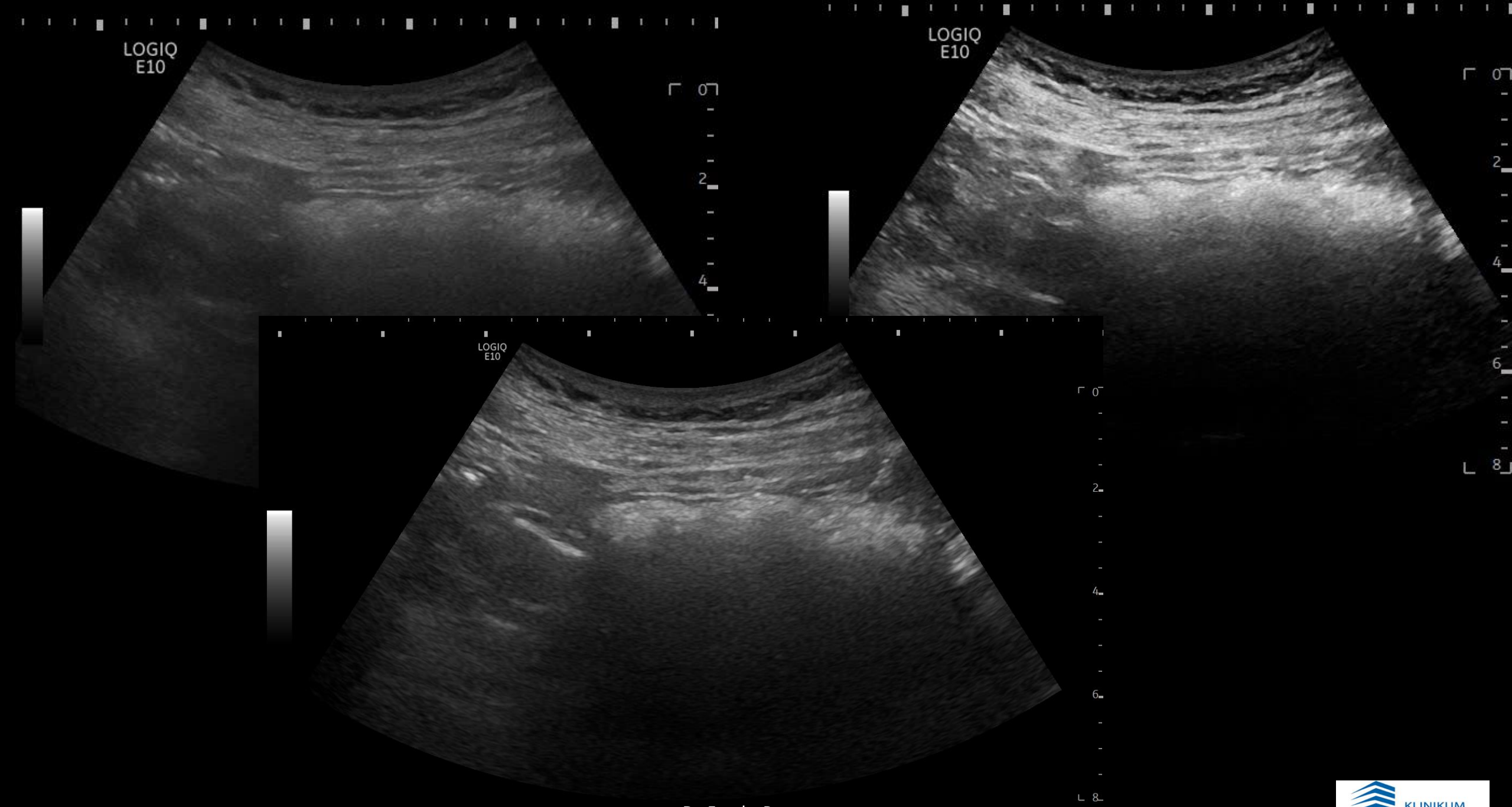
Dynamic range

- Range between the strongest and the weakest precepted echoes in amplitudes
- The range has to be compressed for the display depending on the needs of the examiner, and can be adjusted in non-linear settings

KLINIKUM LÜNEBURG

within a largely homogenous tissue, a wide dynamic range is helpful.

Dr. Frauke Petersen



Dr. Frauke Petersen

KLINIKUM LÜNEBURG

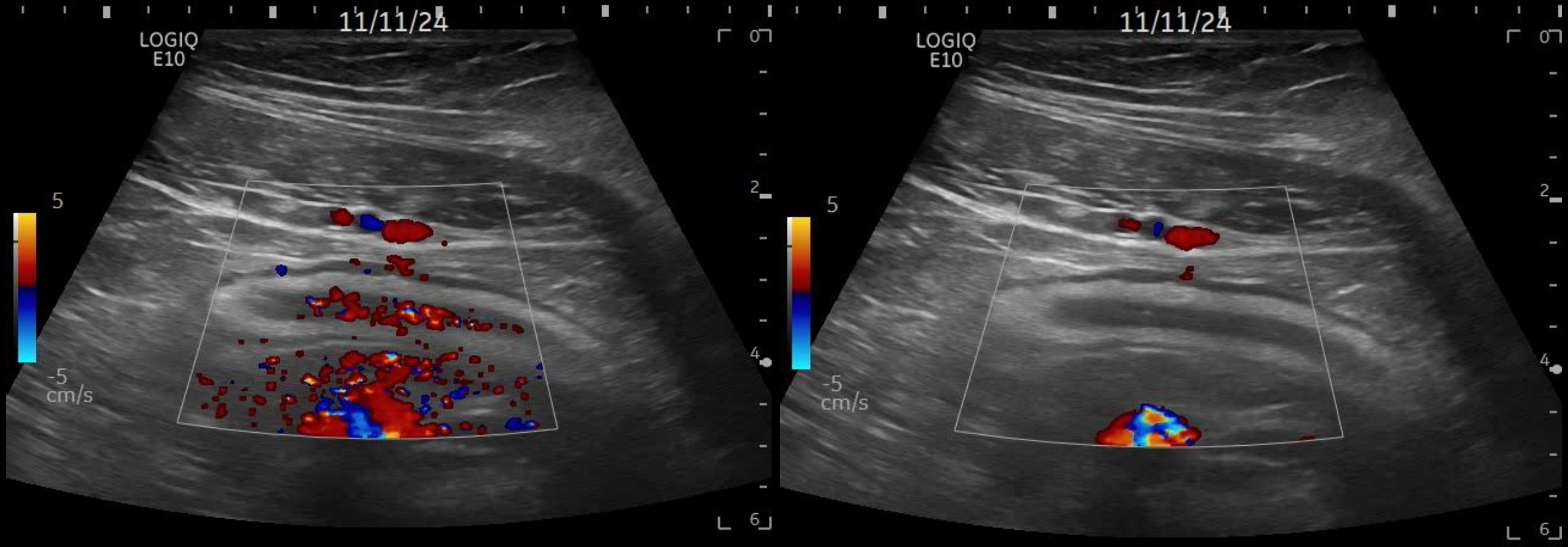
Dr. Frauke Petersen

Image optimization: Colour doppler

- The role of the gain
- The role of the angle
- The box and it‘s position
- What is moving ?
- The role of the PRF/ Scale
- The special tools

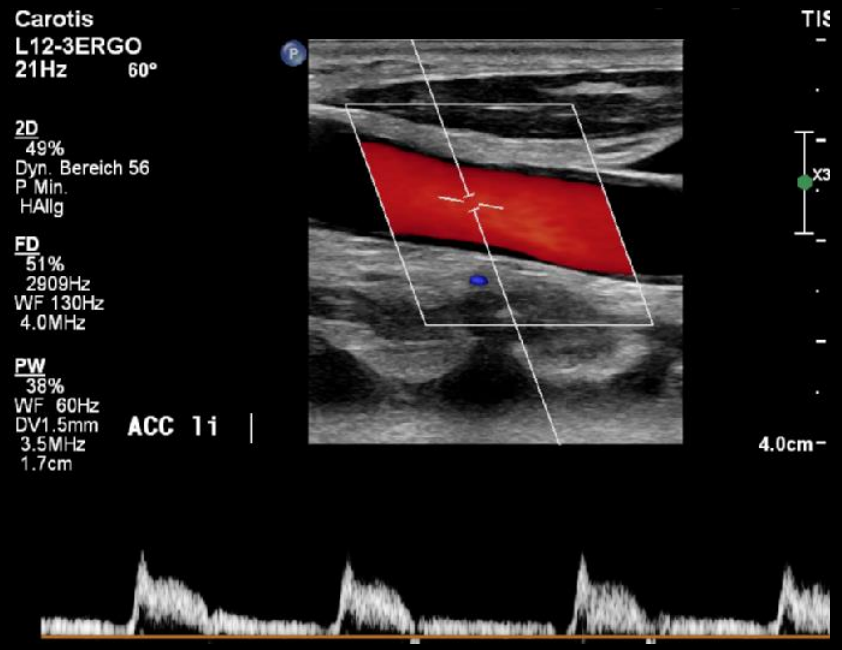
KLINIKUM LÜNEBURG

The role of the gain



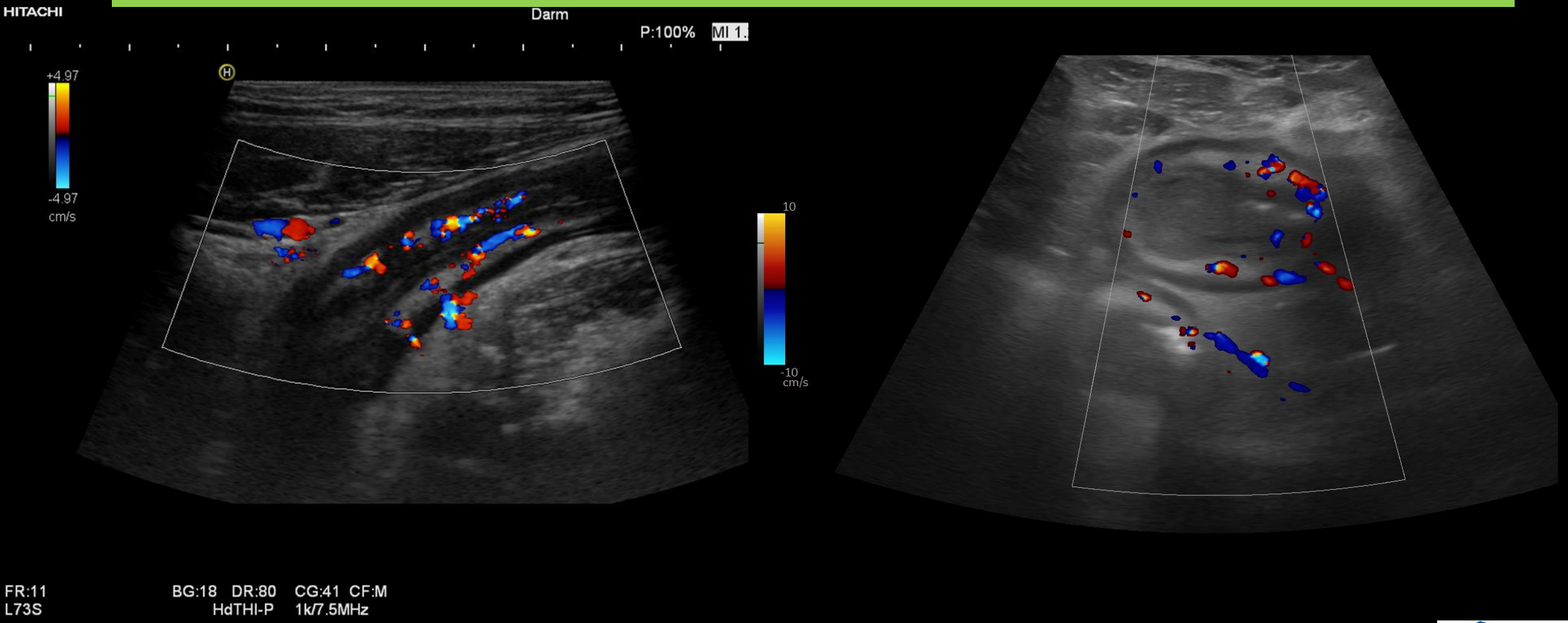
KLINIKUM LÜNEBURG

The role of the angle



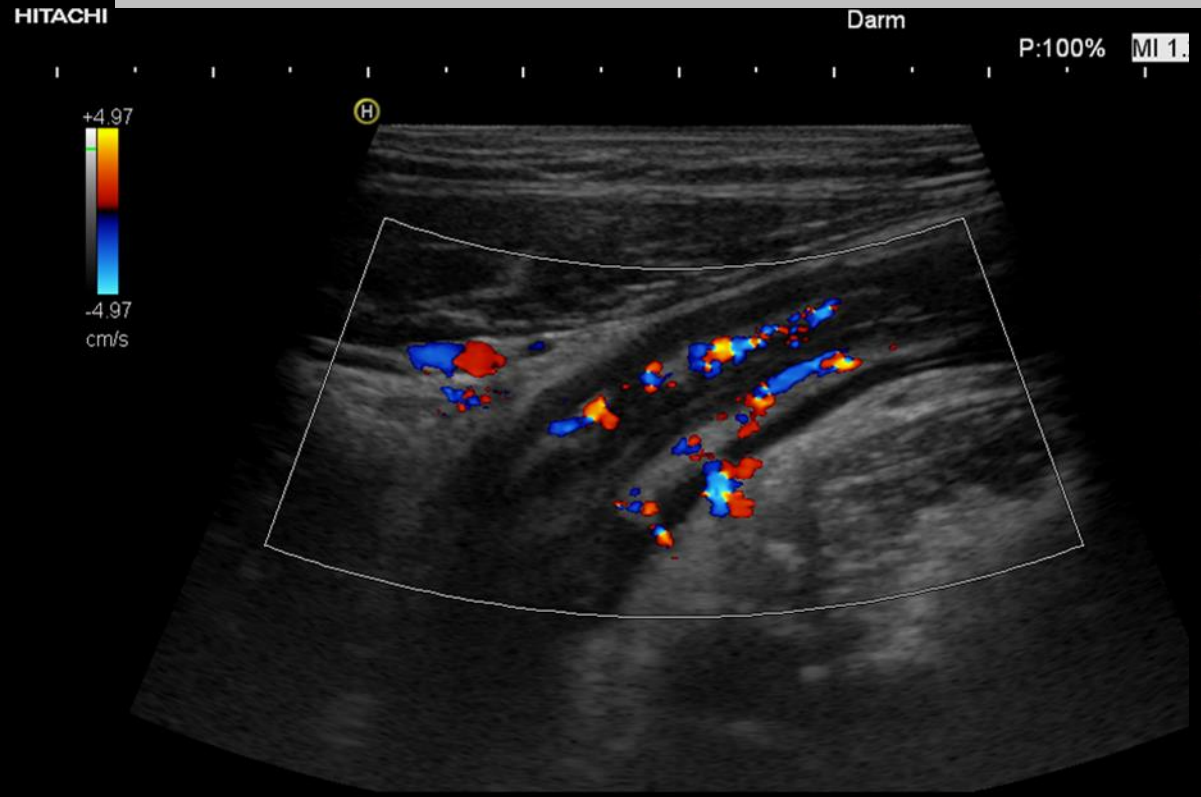
KLINIKUM LÜNEBURG

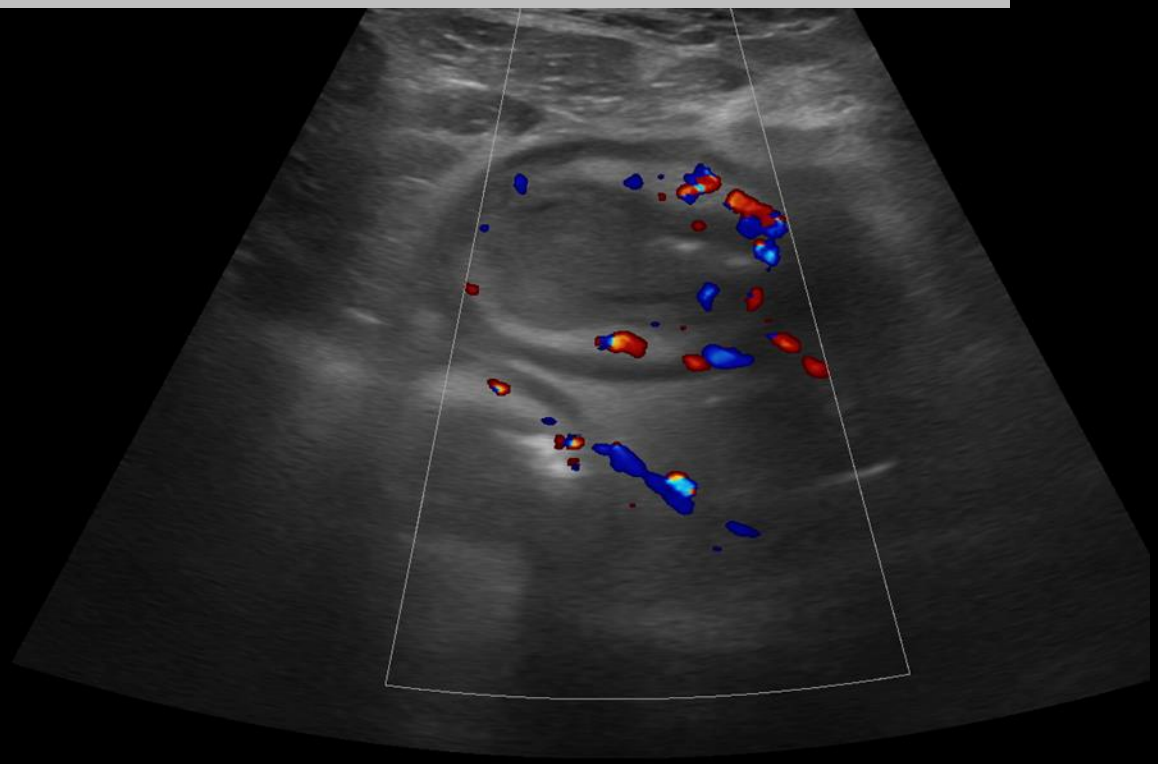
The box and its‘ position



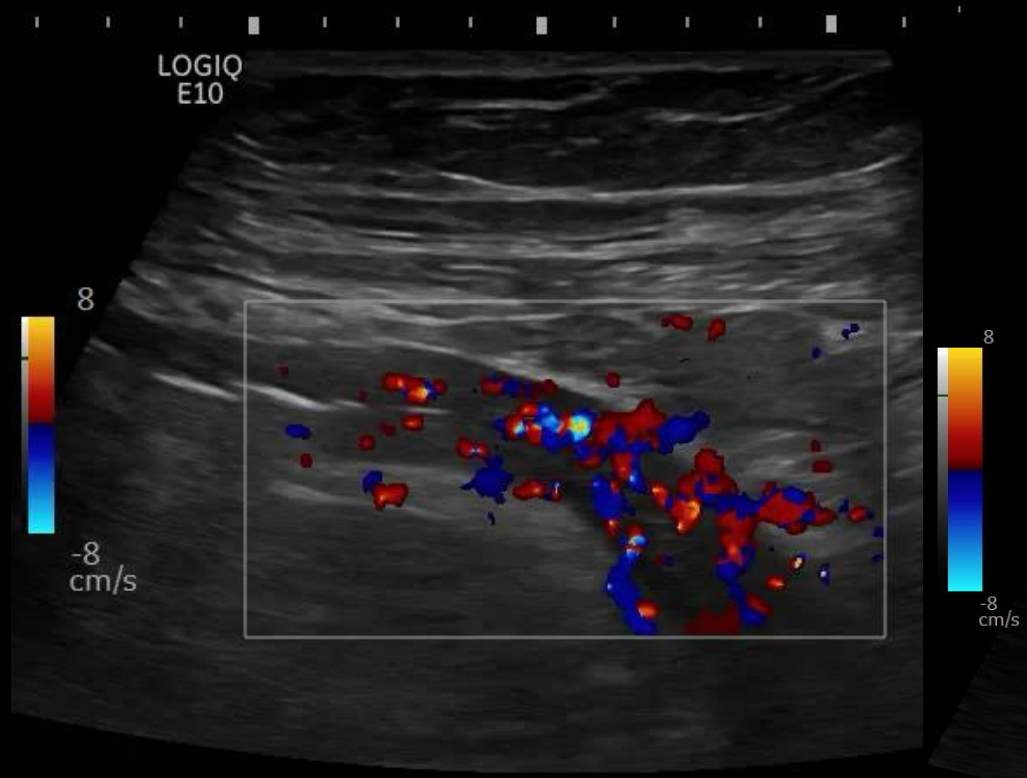
KLINIKUM LÜNEBURG

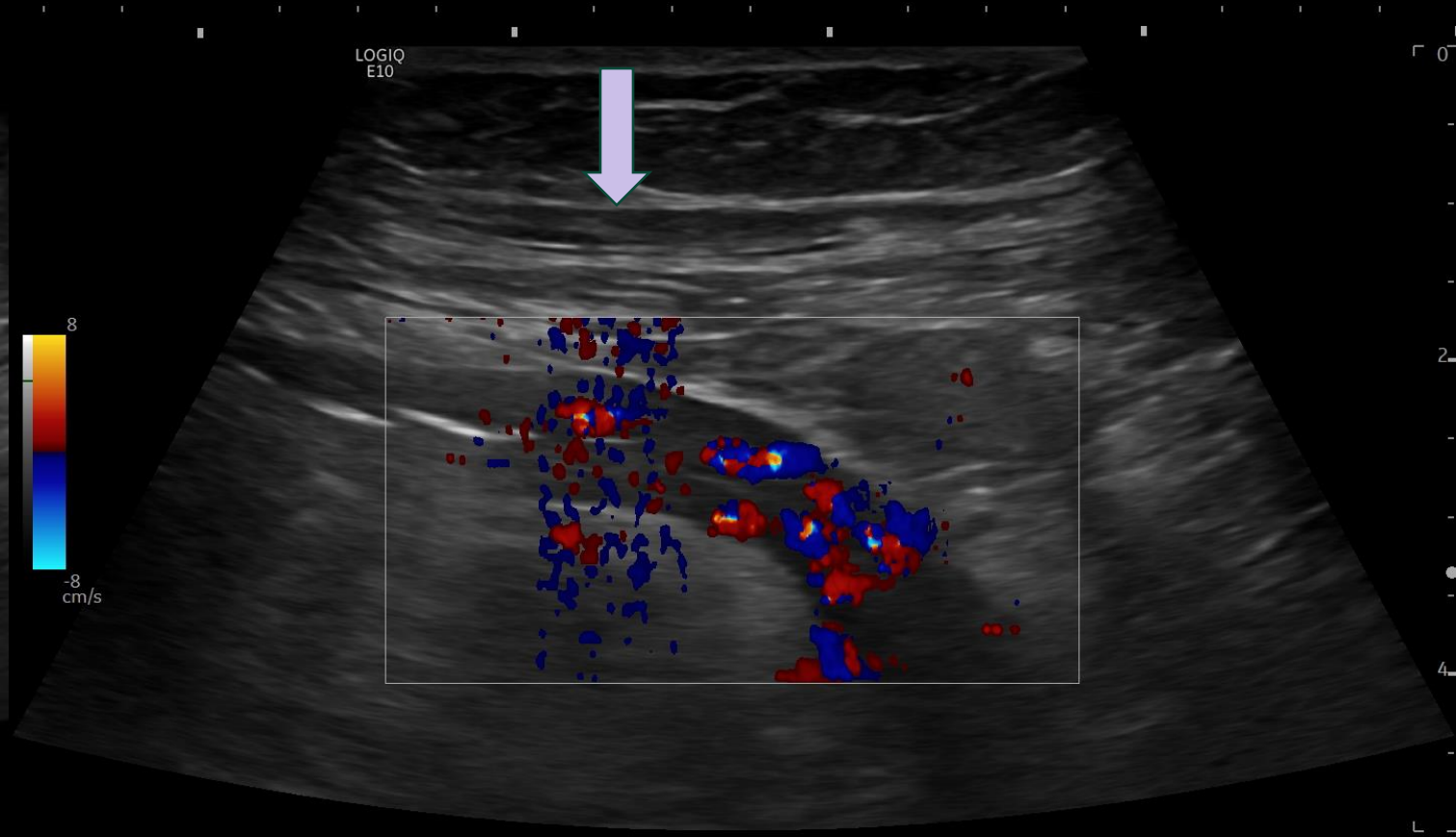
The role of the PRF/ scale





Movement artefacts

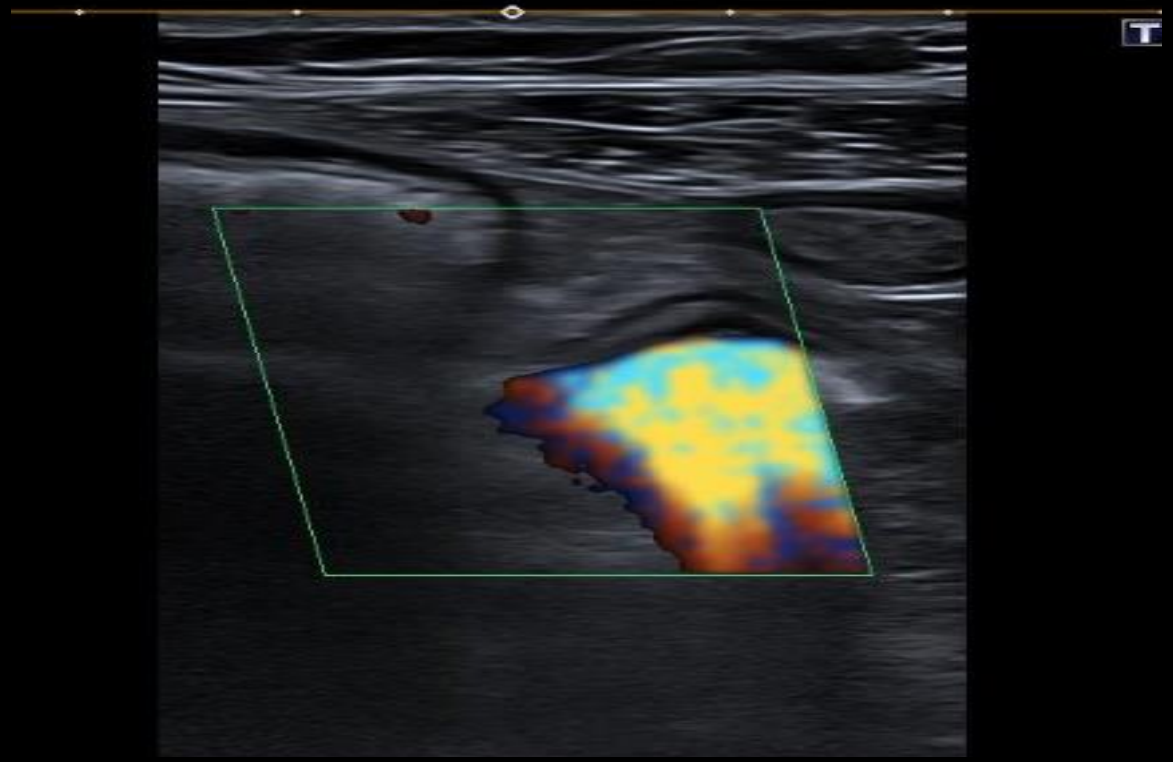




Dr. Frauke Petersen

KLINIKUM LÜNEBURG

Movement artefacts



KLINIKUM LÜNEBURG

Movement artefacts

Frame rate low?

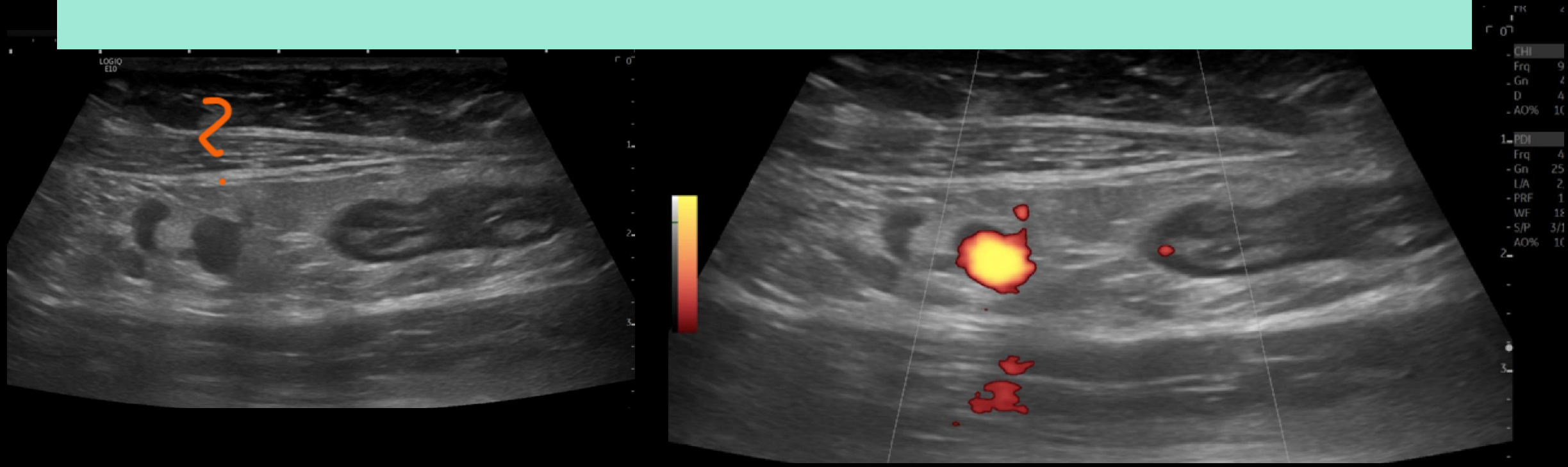
„ aquarell“ undefined edges

KLINIKUM LÜNEBURG

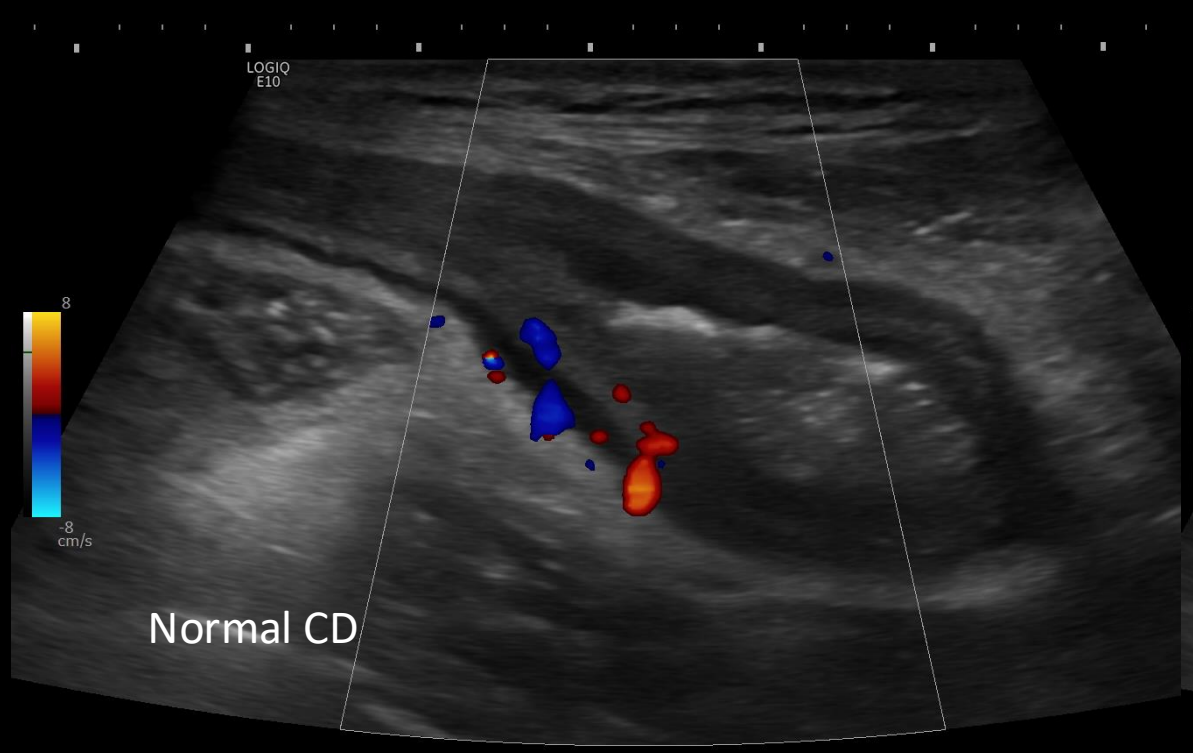
Major rules for a good CD image

- Ensure the Doppler window includes the bowel segment and surrounding fat
- Adjust velocity: +/- 5-7 cm/s
- Adjust Doppler gain
- Move your hand slowly
- You can ask the patient to hold the breath

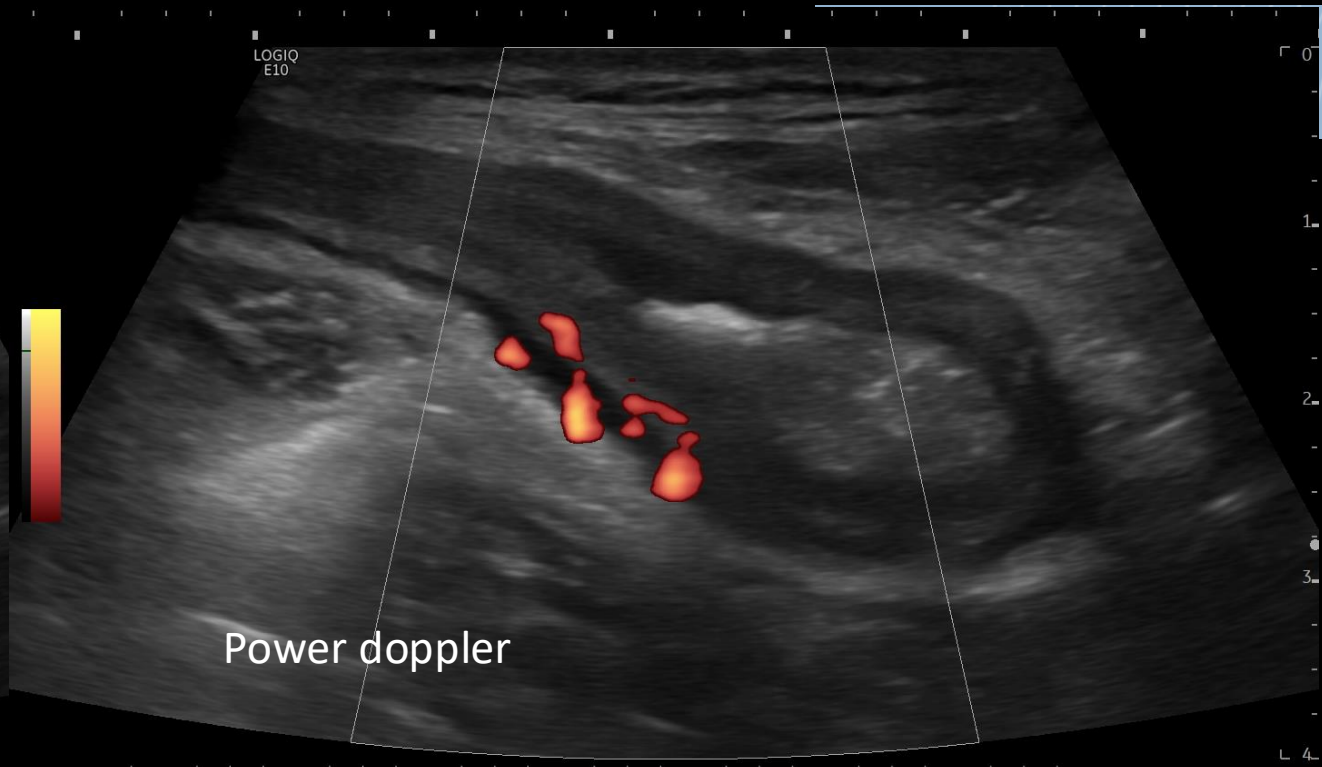
Why power Doppler?



KLINIKUM LÜNEBURG

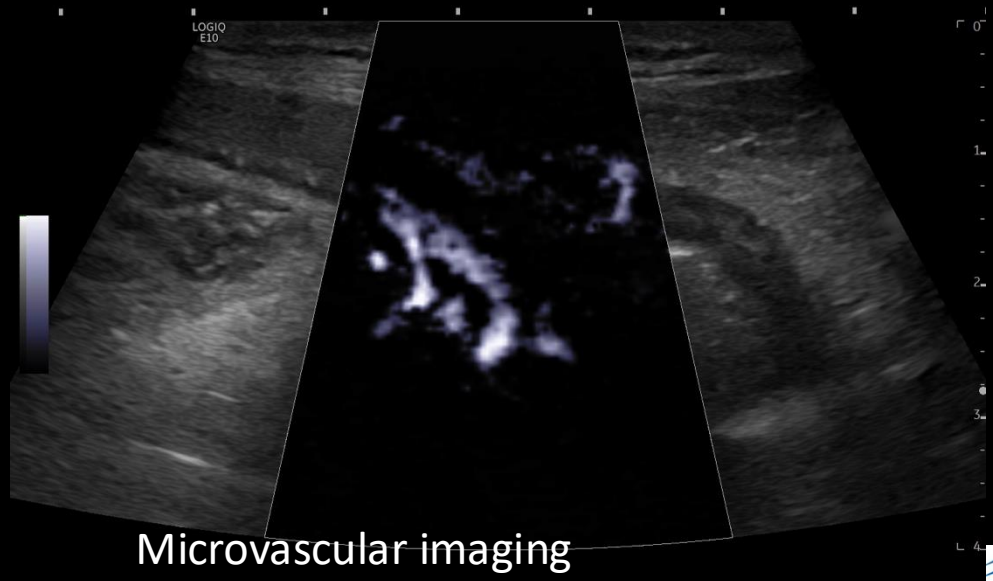


Normal CD



Power doppler

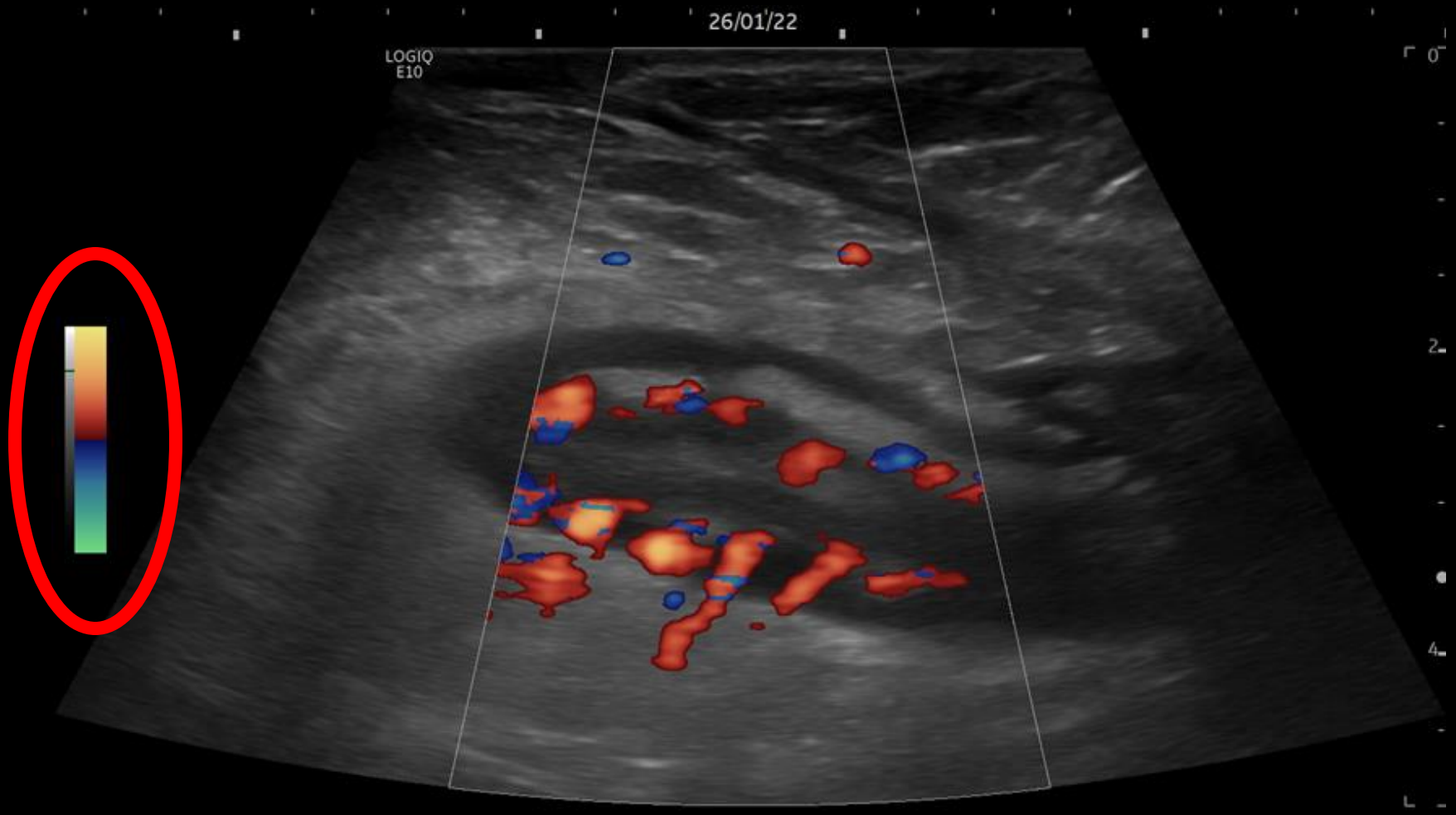
Bi-flow



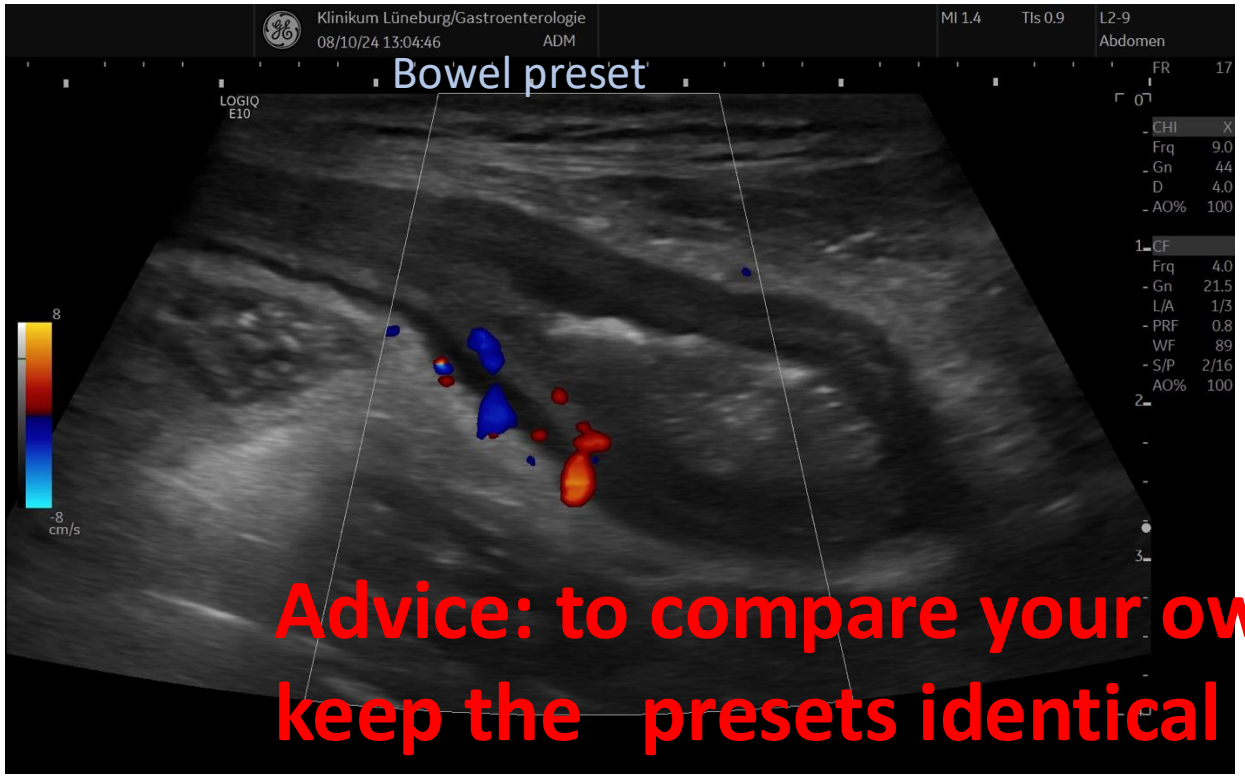
Microvascular imaging

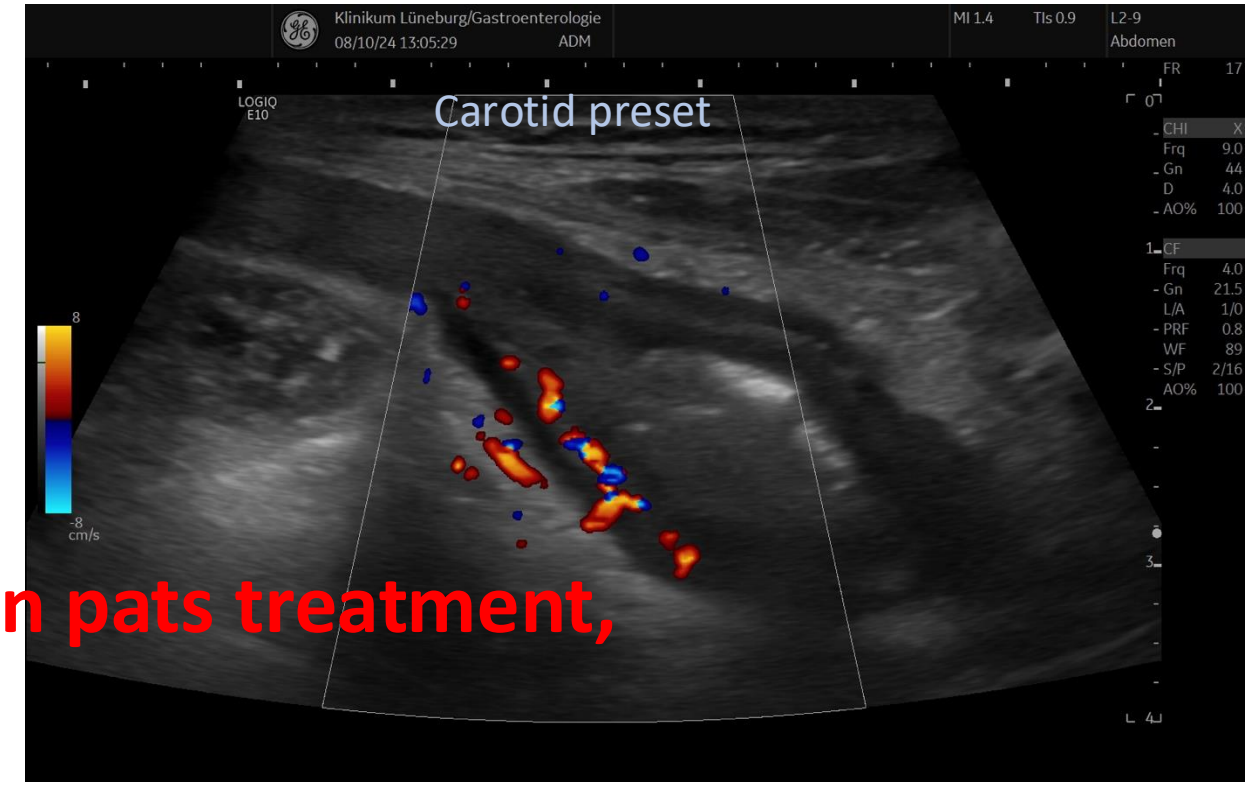
Dr. Frauke Petersen

KLINIKUM LÜNEBURG


26/01/22
LOGIQ
E10

Wall filtering/ signal filtering





Advice: to compare your own pats treatment, keep the presets identical

Are you inspired to play a nice instrument and look into details in the dark ? Thank you for you attention