POCUS I ABDOMEN

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World Journal of Emergency Surgery

REVIEW Open Access

Diagnostic point-of-care ultrasound (POCUS) for gastrointestinal pathology: state of the art from basics to advanced

Fikri M Abu-Zidan[1*] and

Abstract

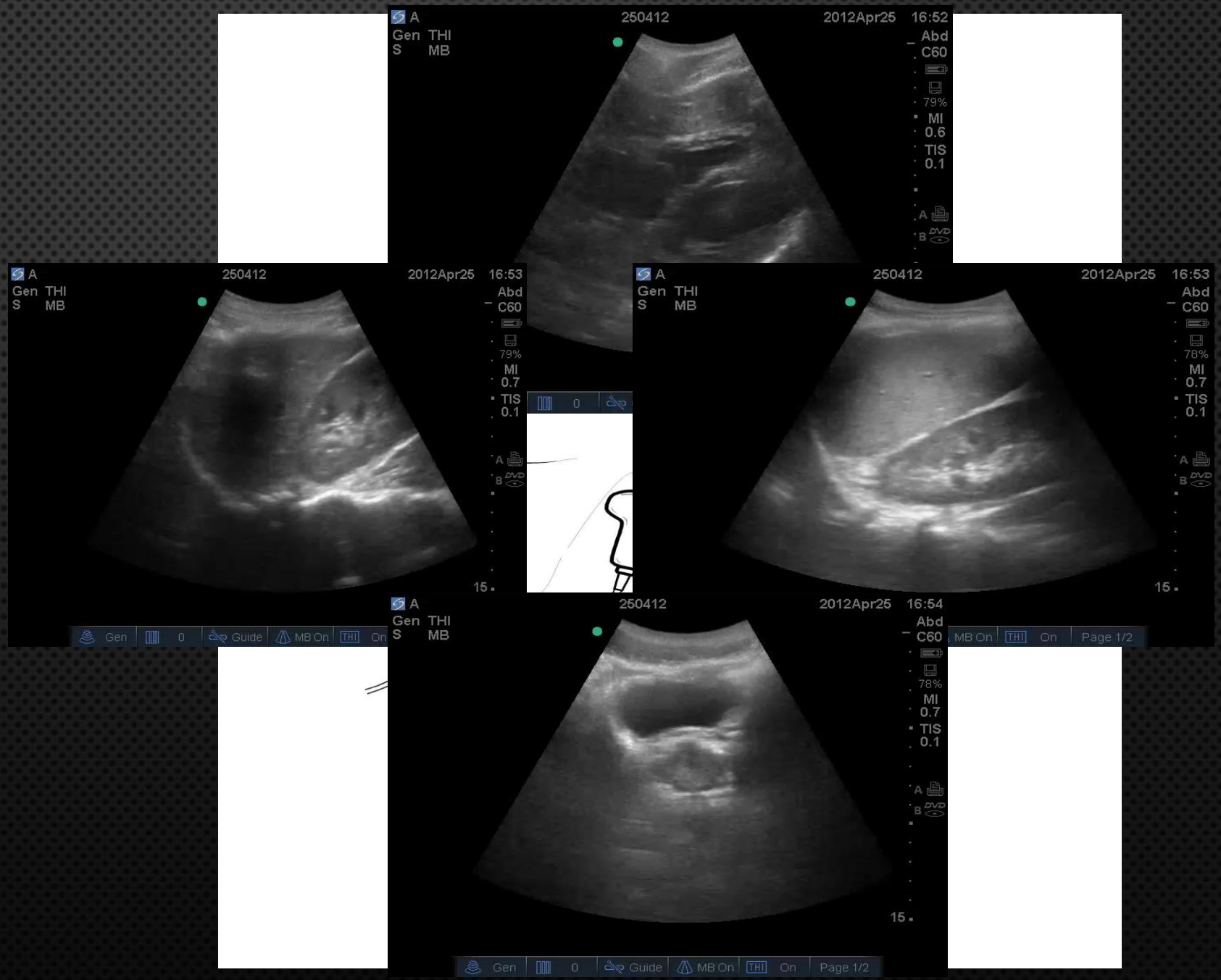
The use of point-of-care
different from the routin
that is Unique, and Sa
pathologies so as to e
useful primer for clinic
physics, technical aspe
and bowel obstruction
encountered by acute
pseudomembranous c
of the basic physics o
an accurate POCUS di

These significant advantages make POCUS valuable in many clinical settings including emergency departments, intensive care units, and operation theatres. With increased interest, training, and experience, POCUS will have a more pronounced role in diagnosing gastrointestinal pathology. This review aims to lay the basic principles of using POCUS in diagnosing intestinal pathologies so as to encourage residents and young colleagues to learn and master this important tool. It will cover the basic physics, technical aspects, and simple applications including detection of free fluid, free intraperitoneal air, and bowel obstruction. A more advanced and detailed review on specific intestinal pathologies will include appendicitis, epiploic appendagitis, acute diverticulitis, pseudomembranous colitis, intestinal tuberculosis, Crohn's disease, and colonic tumours.

FAST

FOCUSSED ASSEESSMENT WITH SONOGRAPHY FOR TRAUMA

- Pericardial
- Perisplenic
- Perihepatic
- Pelvis



e-FAST

- Pericardial
- Perisplenic (LUQ)
- Perihepatic (RUQ)
- Pelvis

- + 2 Pleural scans

Statistics in whole study population.

	Pneumothorax (n = 21/204)	TP/FP/FN	Sensitivity	Specificity	PPV	NPV	DA
Clinical examination	17	13/4/8	62	98	76	95	94
CXR	16	15/1/4	79	99	94	98	97
EFAST	21	20/1/1	95	99	95	99	99

CXR – chest X-ray, EFAST – extended focused abdominal sonogram for trauma, TP – true positive, FP – false positive, FN – false negative, PPV – positive predictive value, NPV – negative predictive value and DA – diagnostic accuracy.

* Nandipati et al. Extended focused assessment with sonography for trauma (EFAST) in the diagnosis of pneumothorax: Experience at a community based level I trauma center; Injury, Int. J. Care Injured 42 (2011) 511–514.

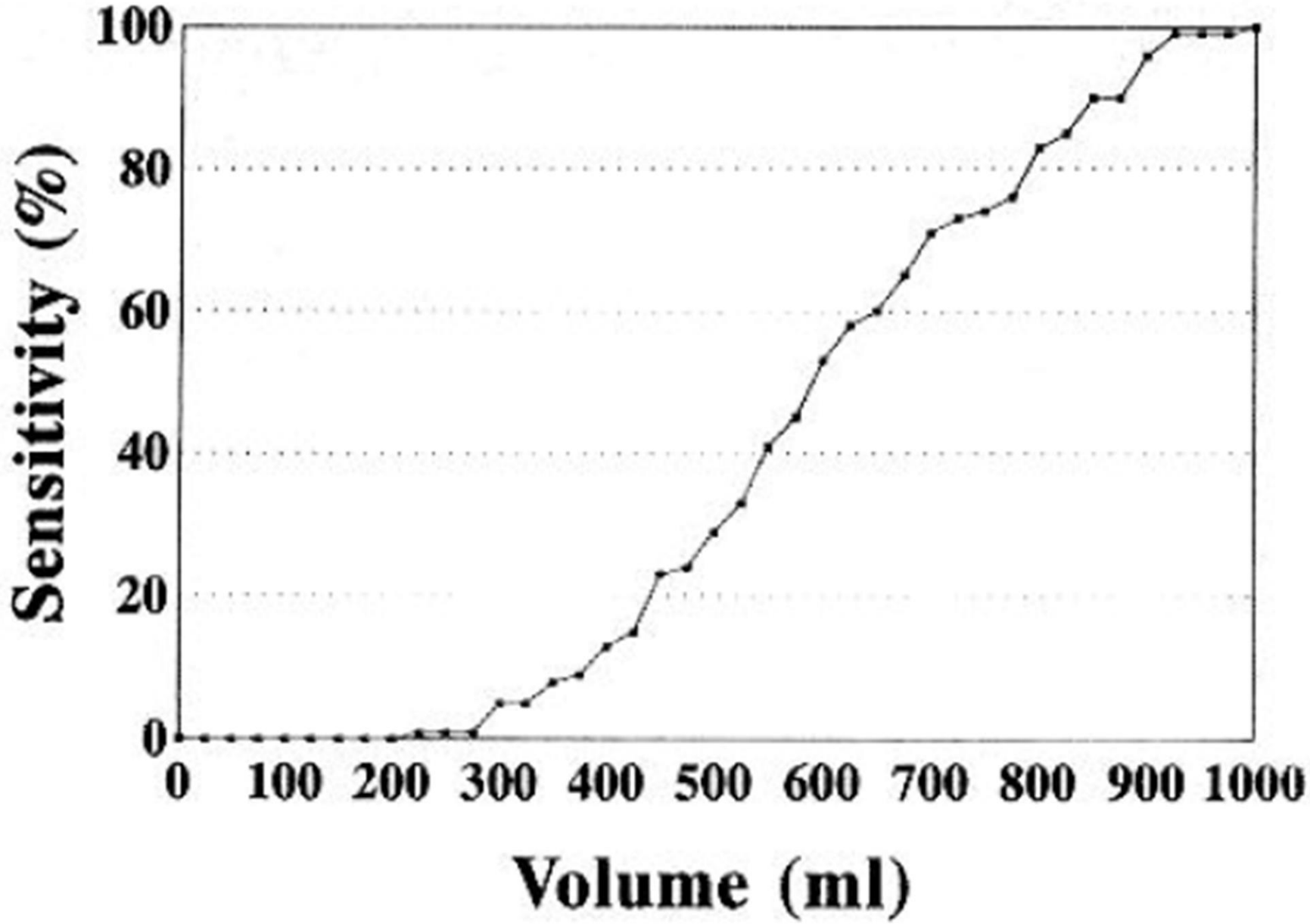
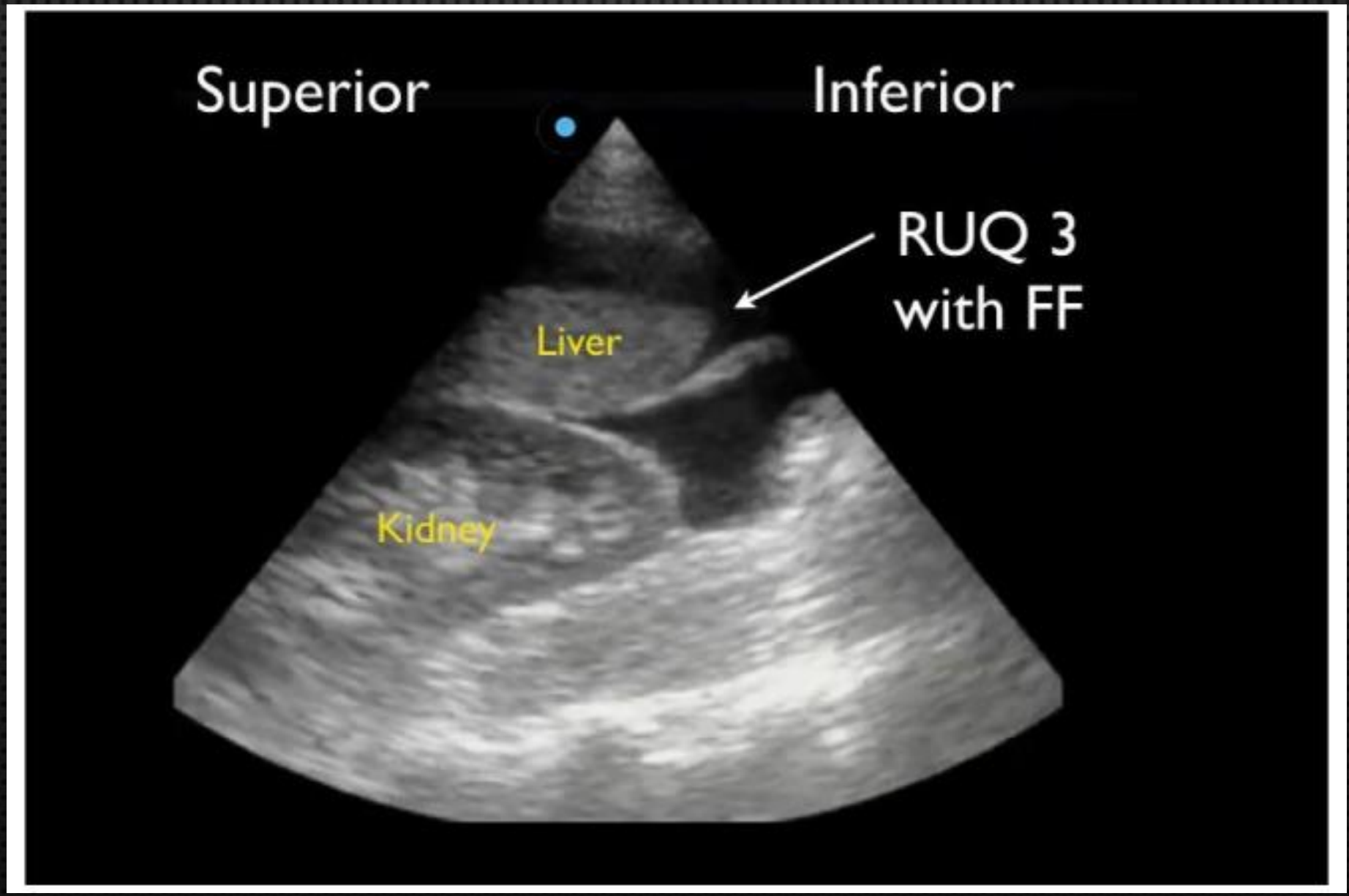
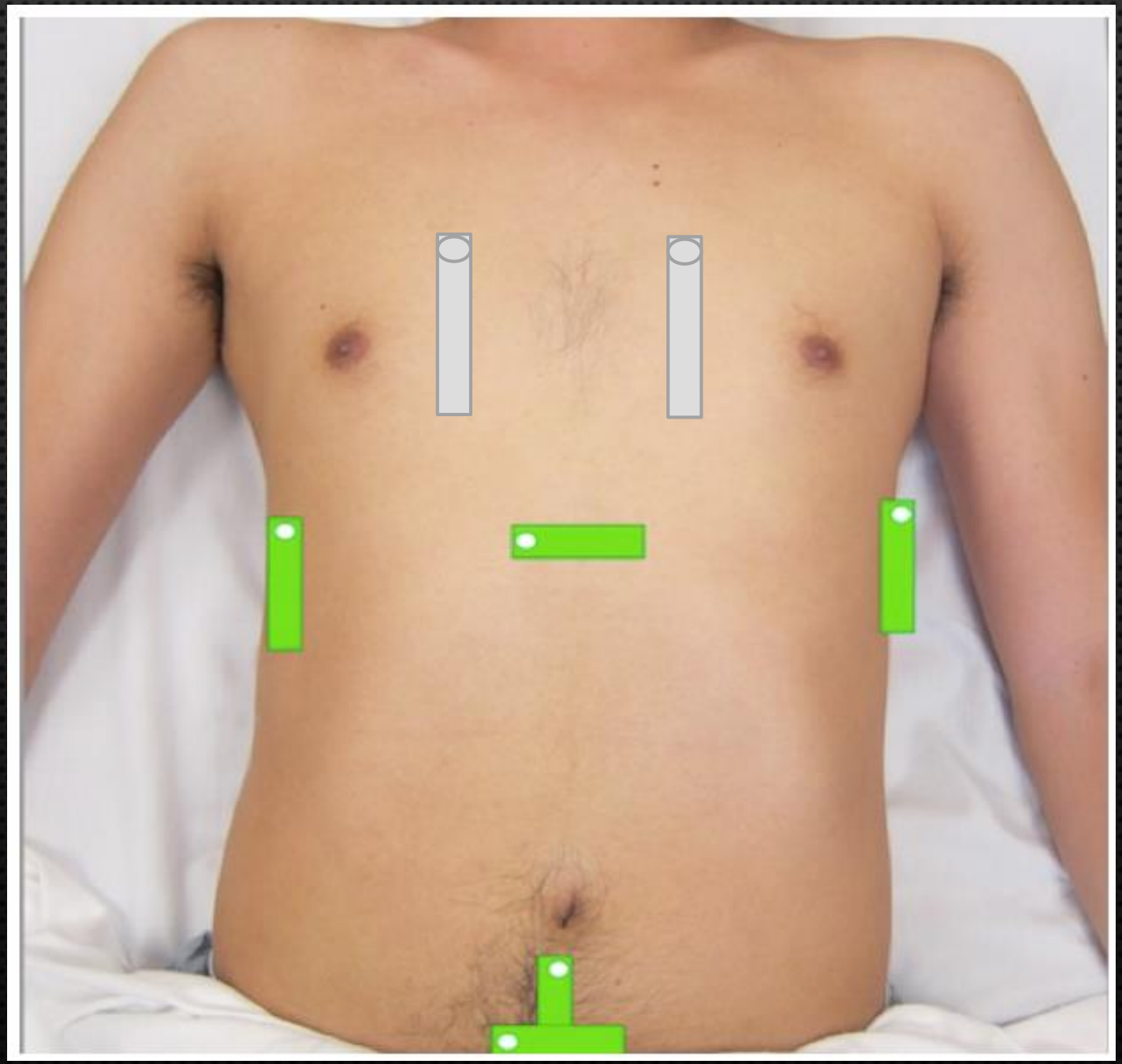


Figure 3. Sensitivity curve based on radiologist-confirmed images of fluid in Morison's pouch.

From: Branney: J Trauma, Volume 39(2).August 1995.375-380



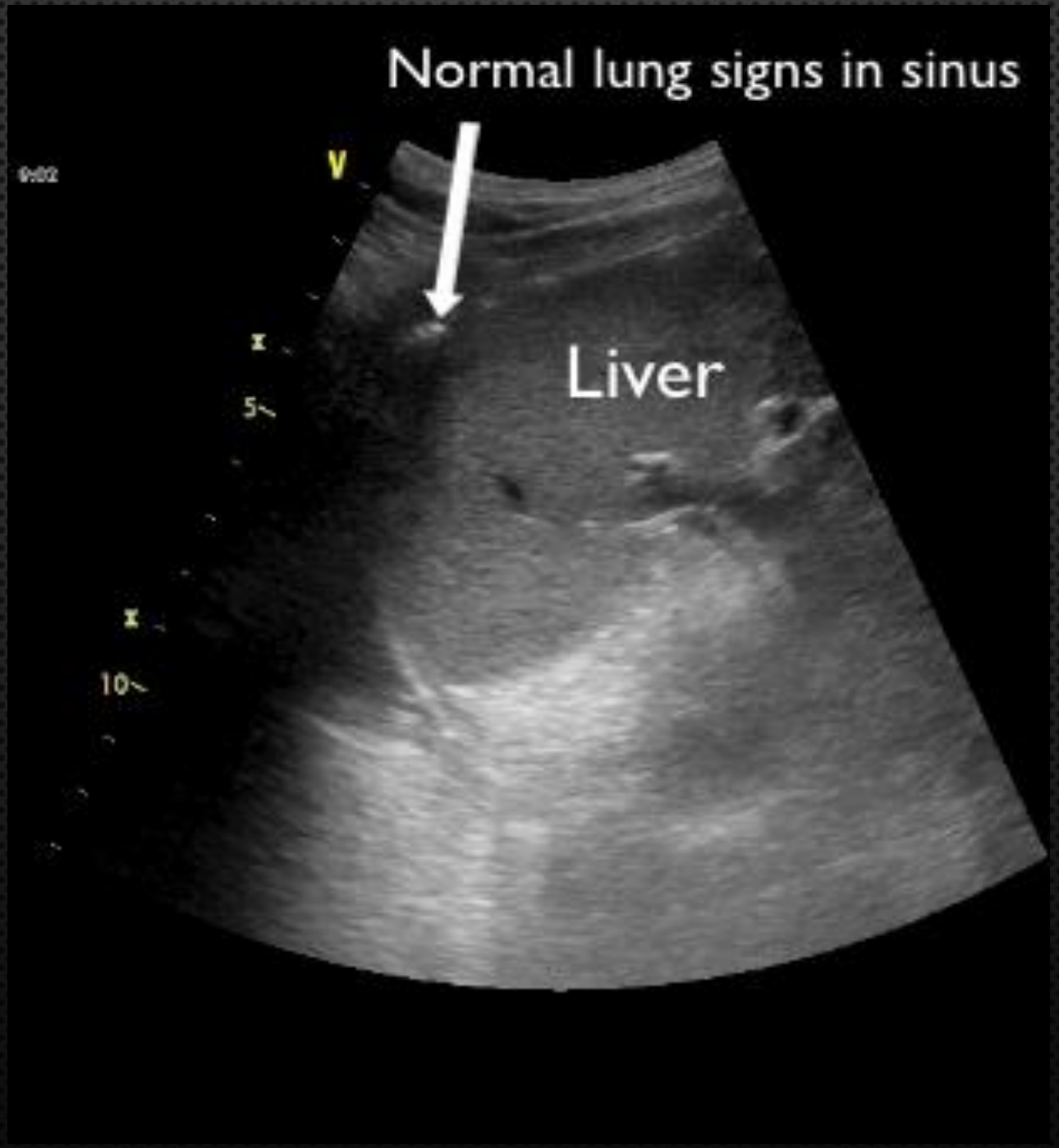
*Lobo et al. Caudal Edge of the Liver in the Right Upper Quadrant (RUQ) View Is the Most Sensitive Area for Free Fluid on the FAST Exam; *West J Emerg Med*. 2017; 18(2): 270-280.



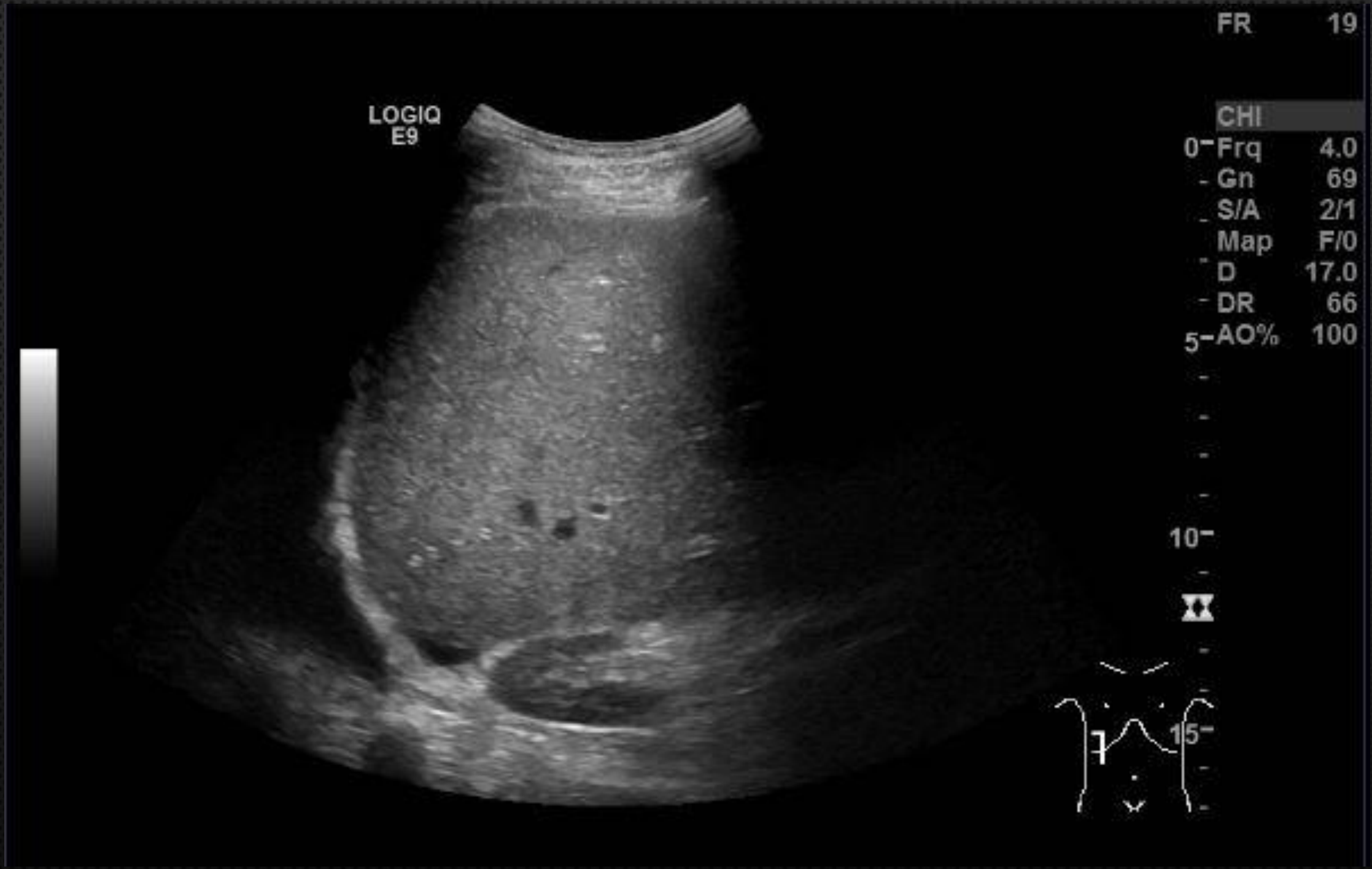
PERIOHEPATIC/ RUQ


LOGIQ
E9
0
5
10


LOGIQ
E9
0
5
10


Normal lung signs in sinus
Liver

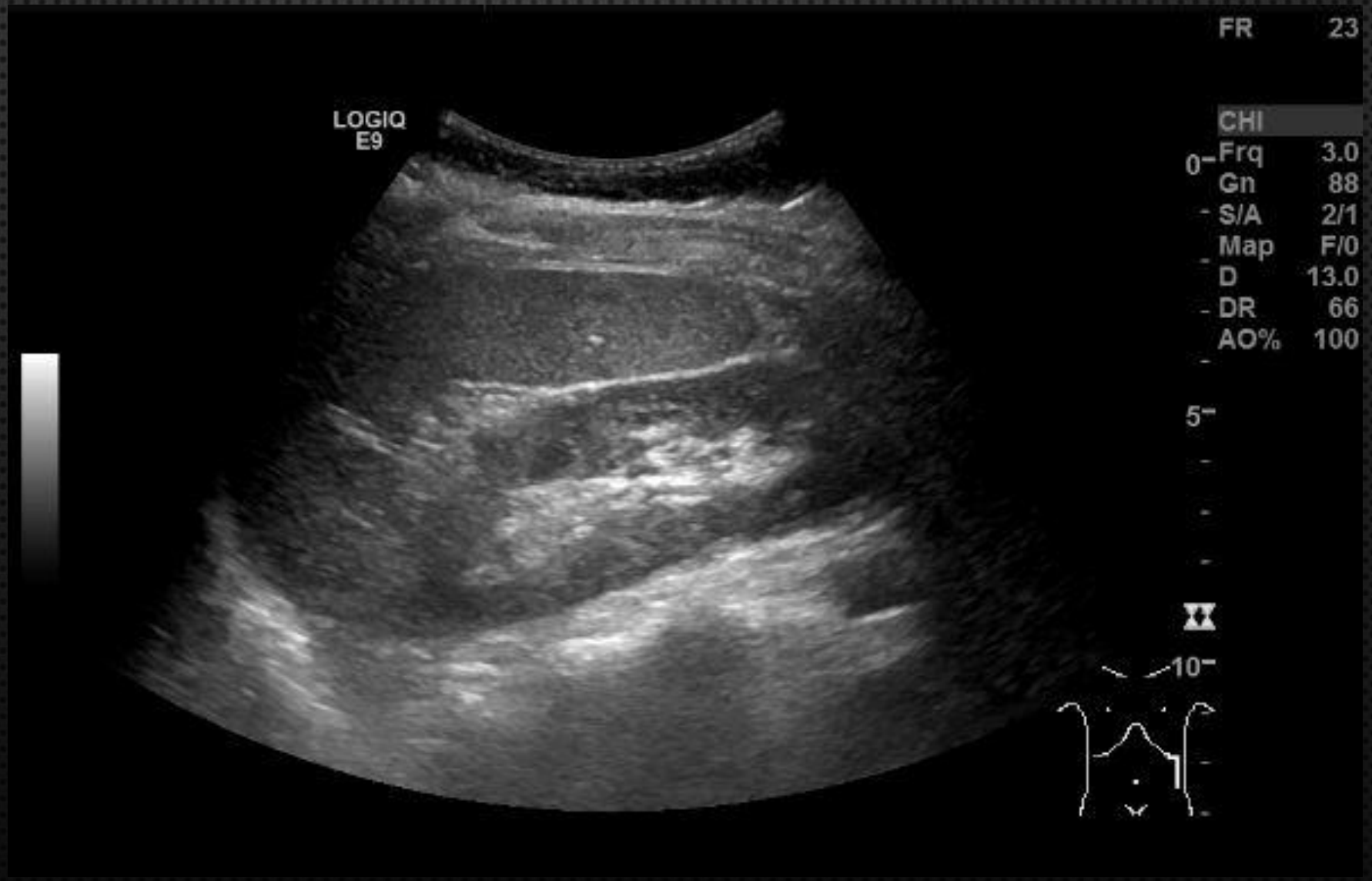

LOGIQ
E9
0
5
10
15


LOGIQ
E9
FR 19
CHI
Frq 4.0
Gn 69
S/A 2/1
Map F/0
D 17.0
DR 66
AO% 100
0
5
10
15


LOGIQ
E9
0
5
10
15
T

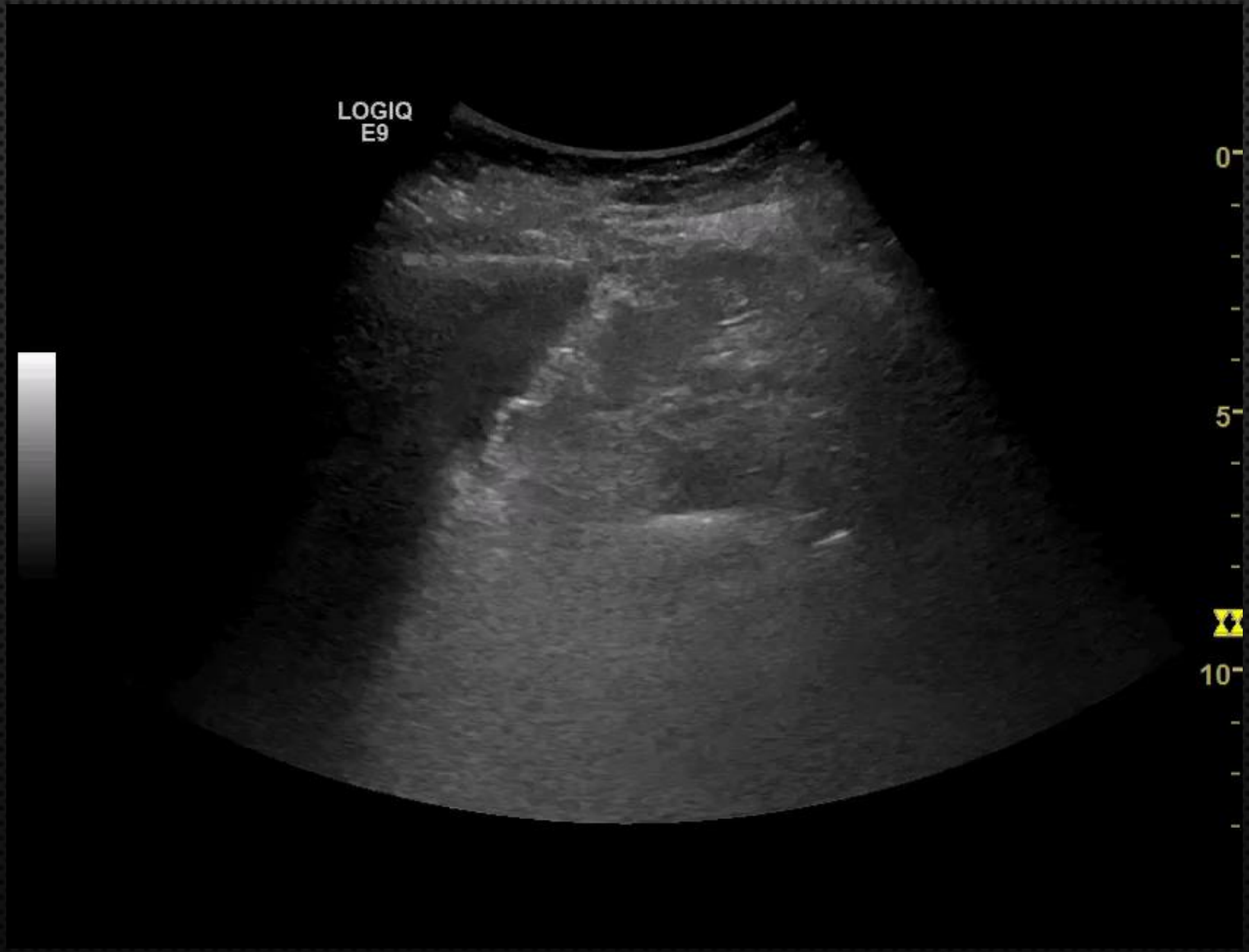

L
1
116
L

PERISPLENIC / LUQ



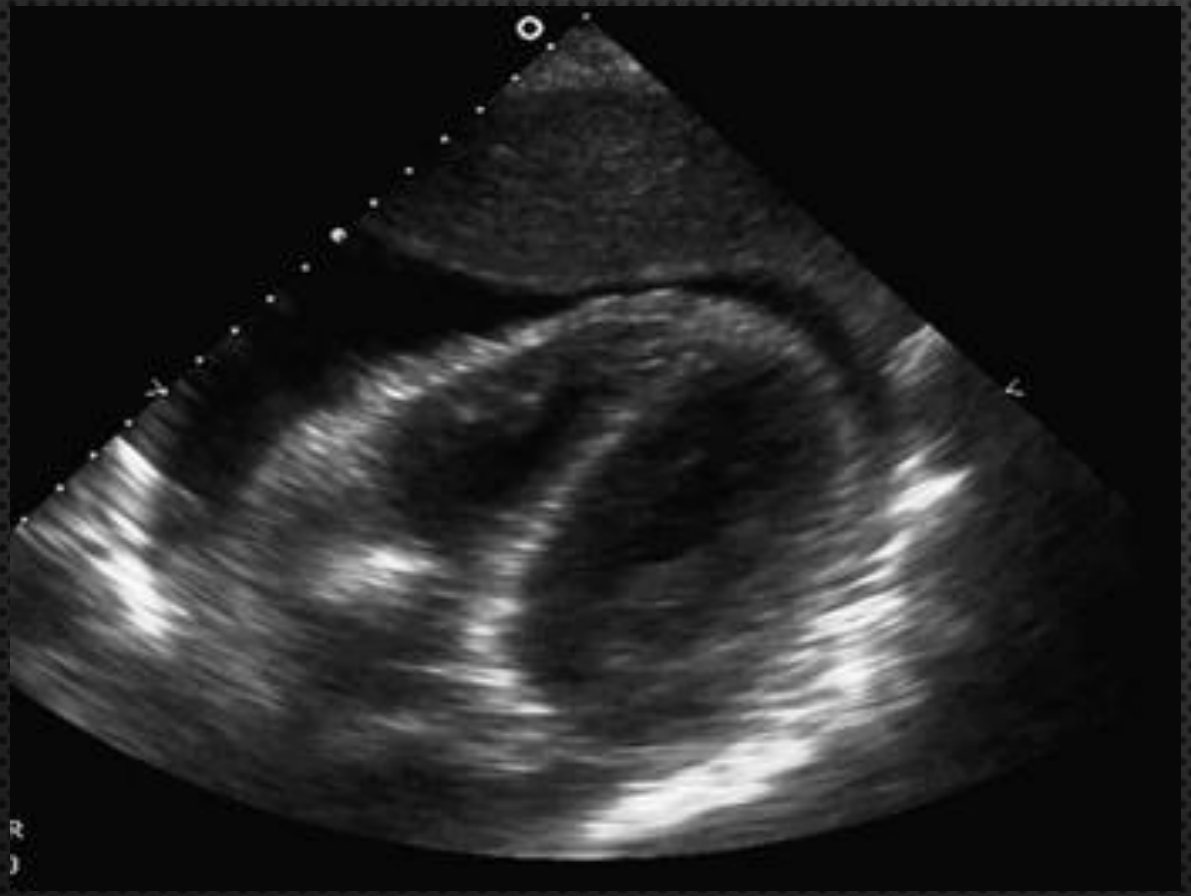

LOGIQ

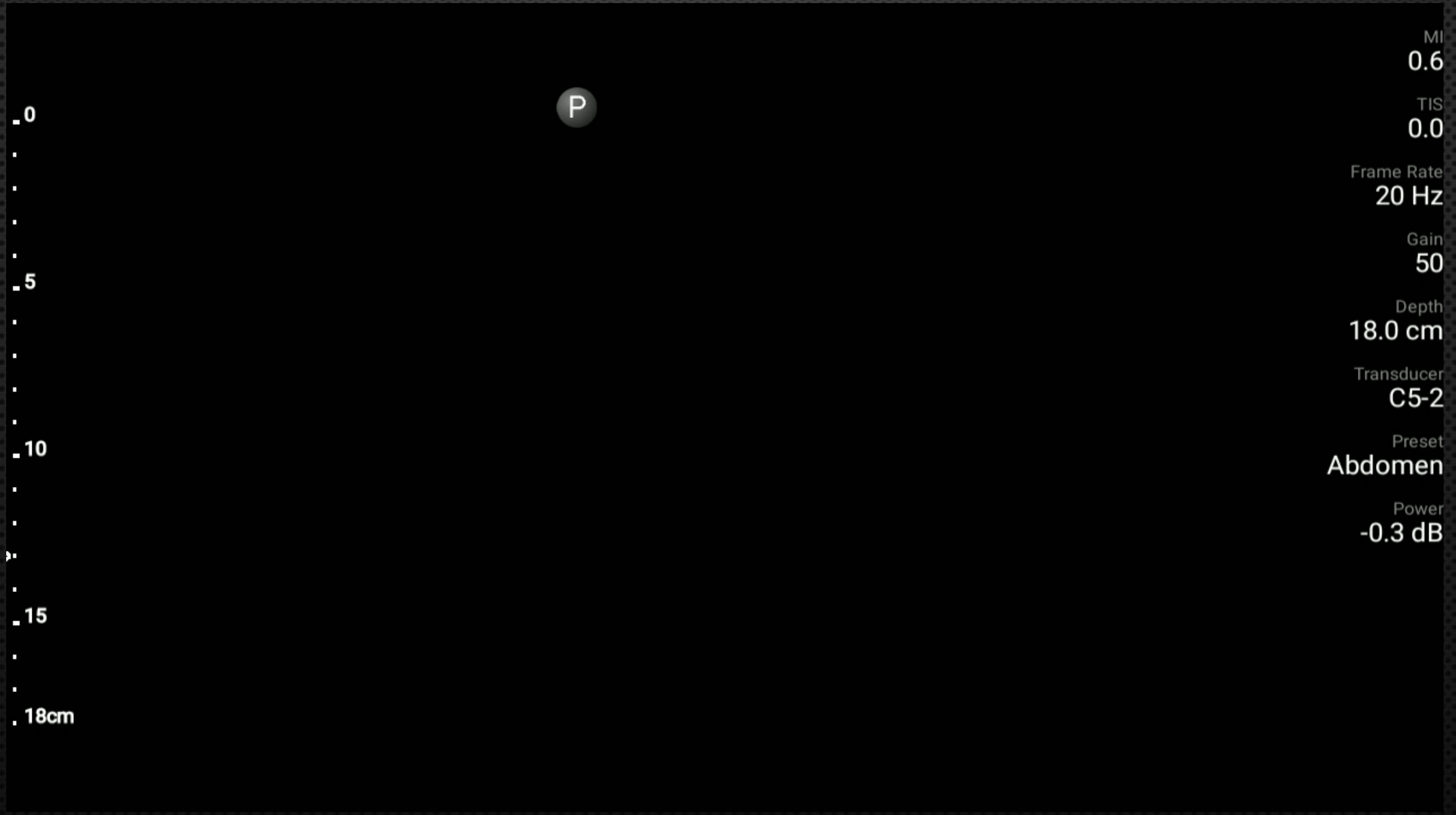

LOGIQ
E9
0
10


LOGIQ
E9
0
5
10


LOGIQ
E9
0
5
10

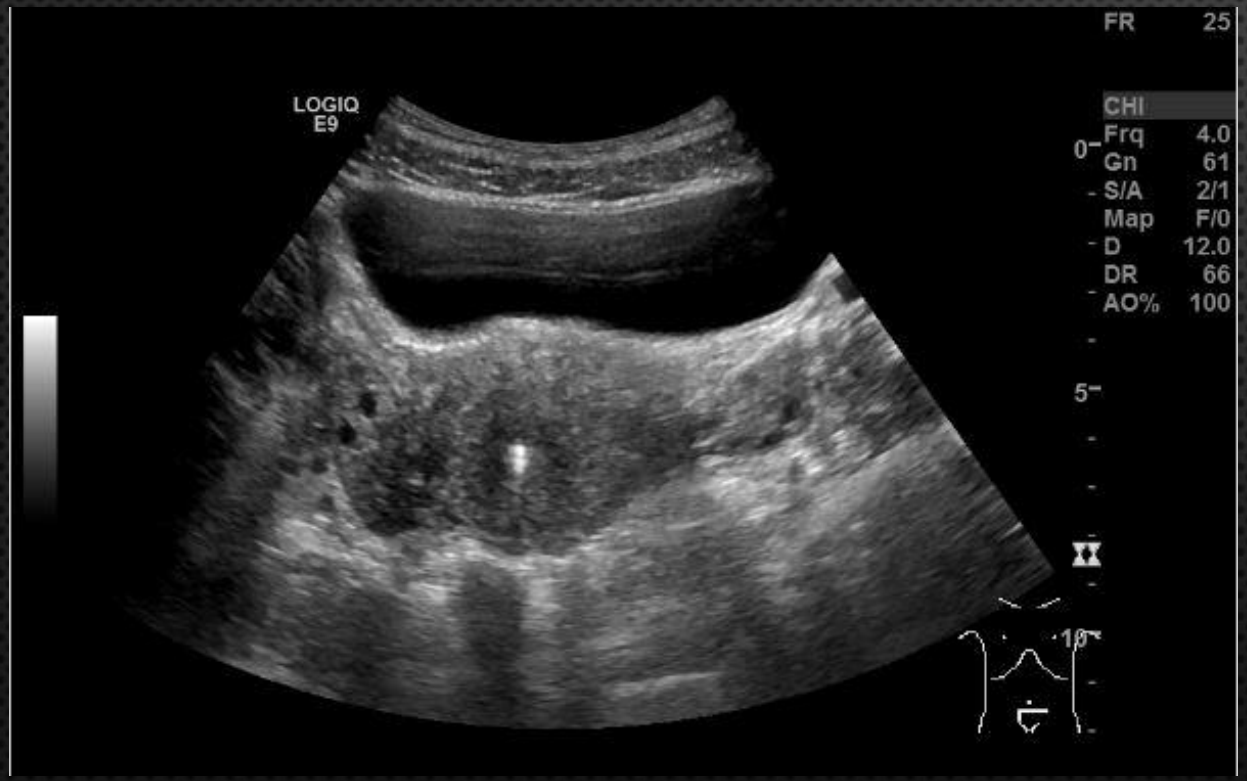
PERICARDIAL

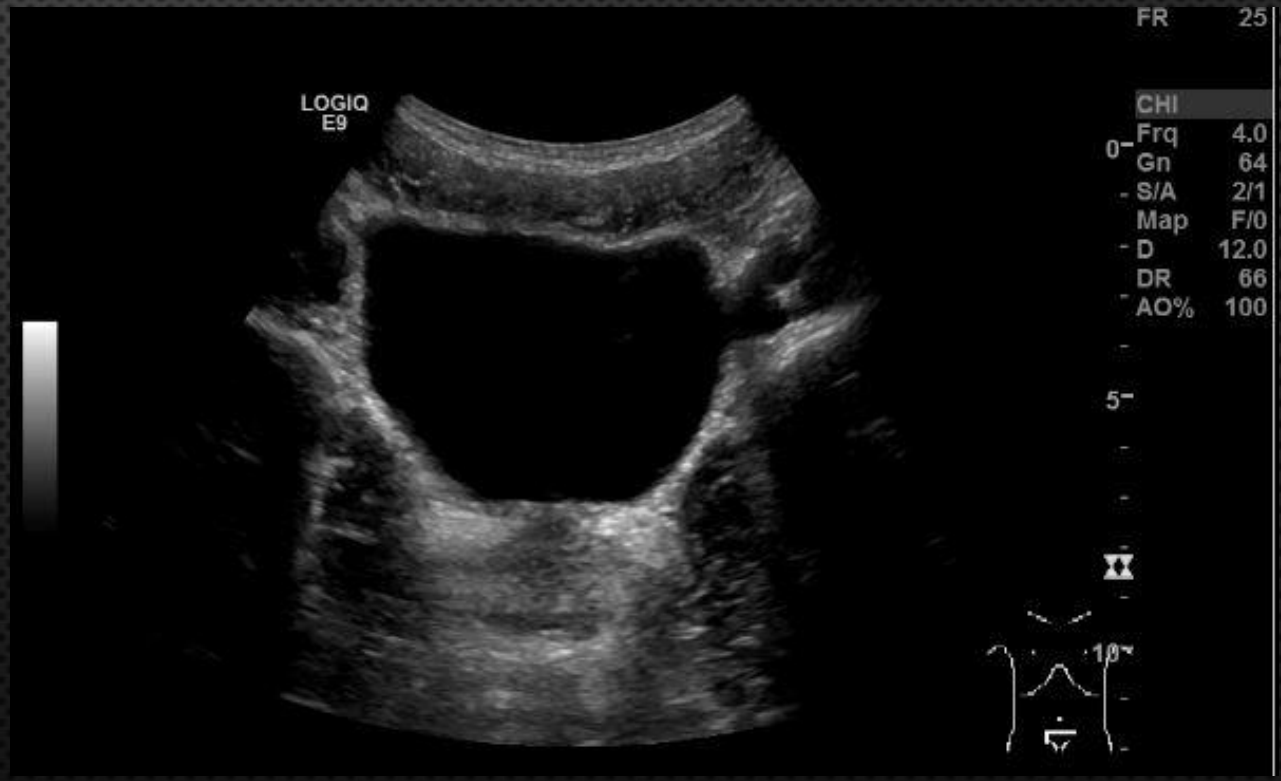



P
0
5
10
15
18cm
MI
0.6
TIS
0.0
Frame Rate
20 Hz
Gain
50
Depth
18.0 cm
Transducer
C5-2
Preset
Abdomen
Power
-0.3 dB


GE
L3
5
10
15

PELVIS


FR 25
LOGIQ
E9
CHI
Frq 4.0
Gn 61
S/A 2/1
Map F/0
D 12.0
DR 66
AO% 100
0
5
10


FR 25
LOGIQ
E9
CHI
Frq 4.0
Gn 64
S/A 2/1
Map F/0
D 12.0
DR 66
AO% 100
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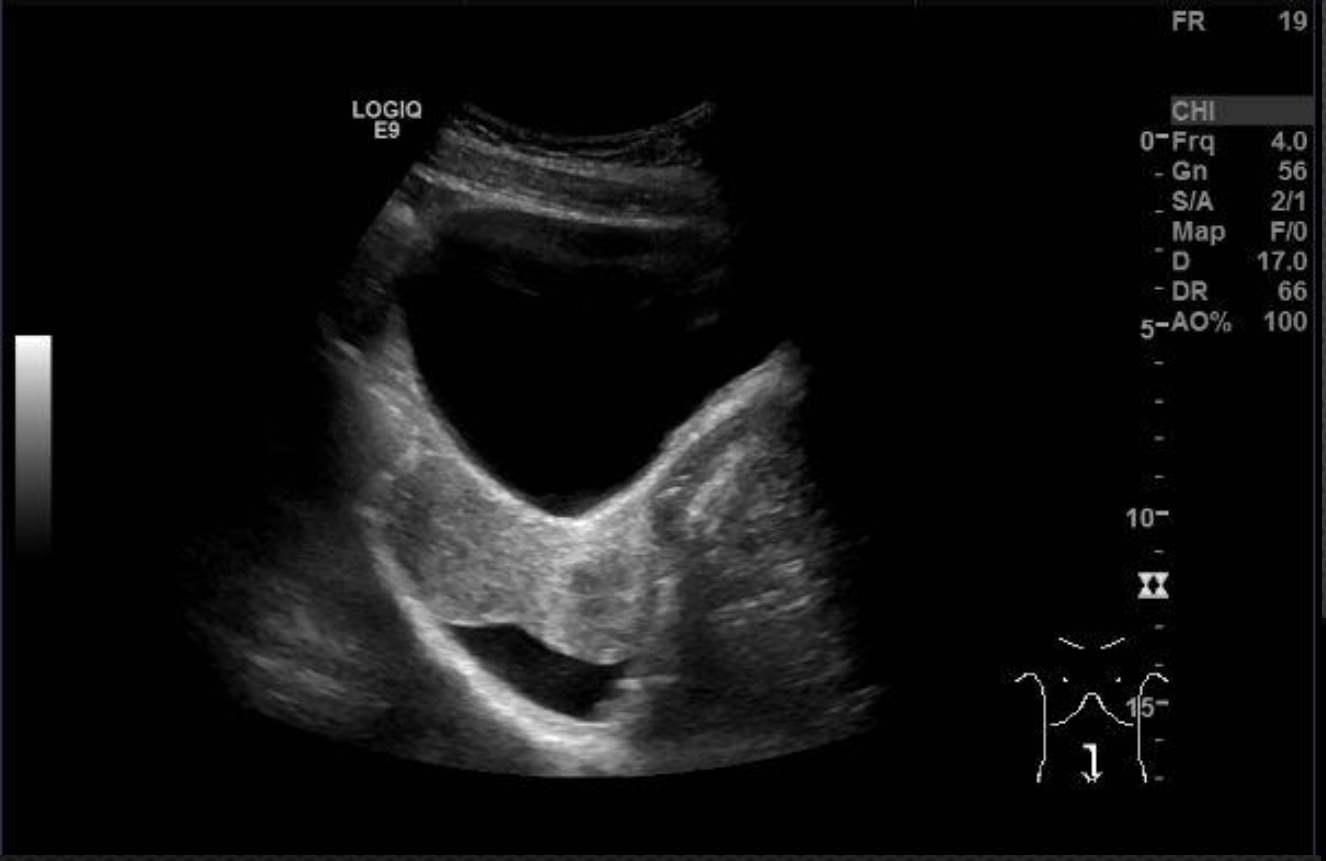
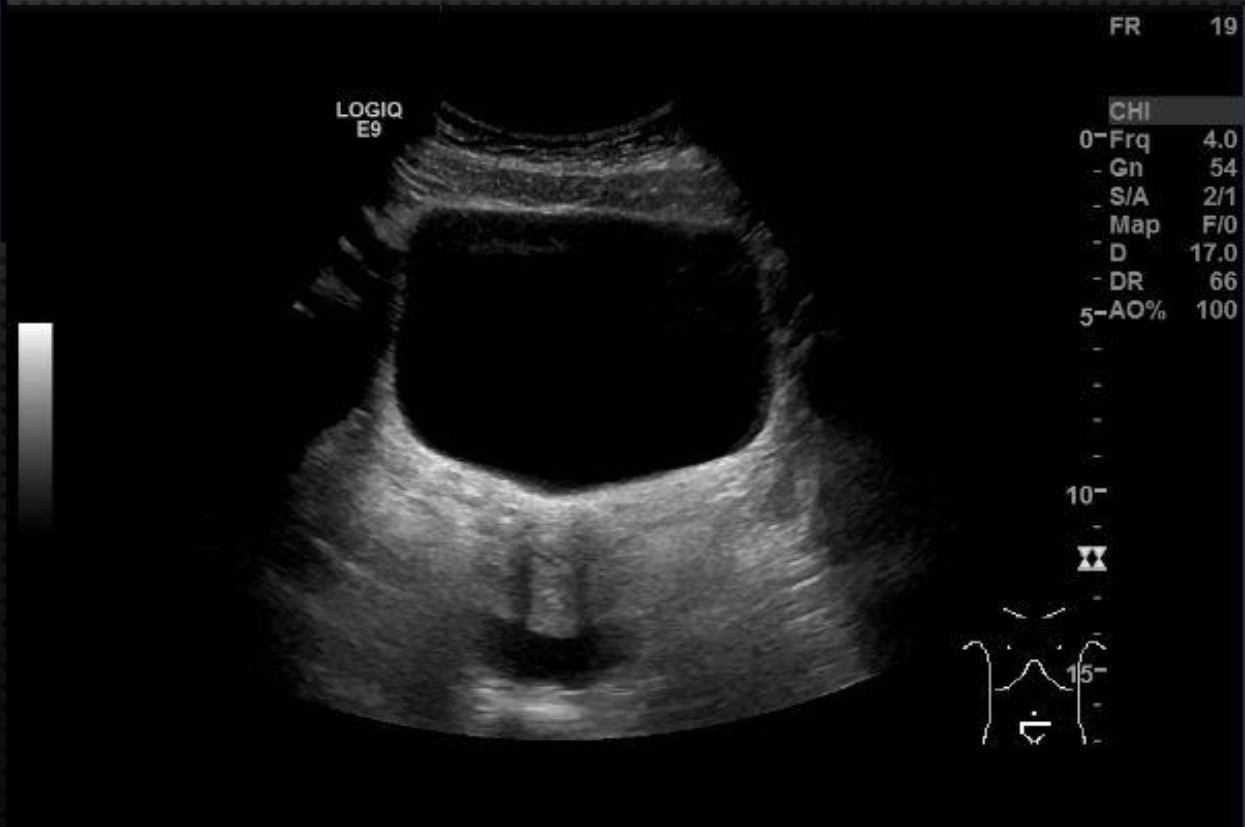
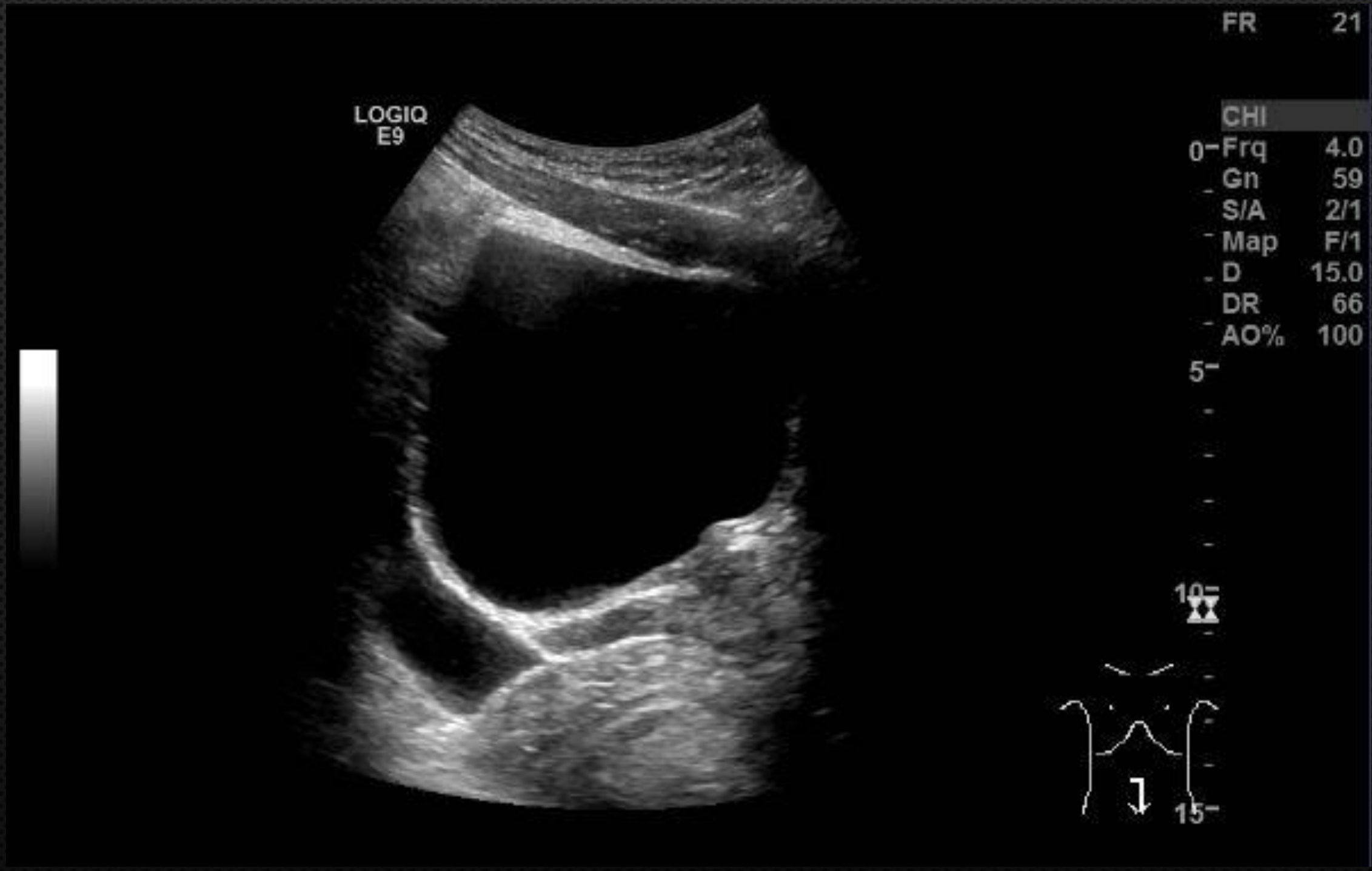
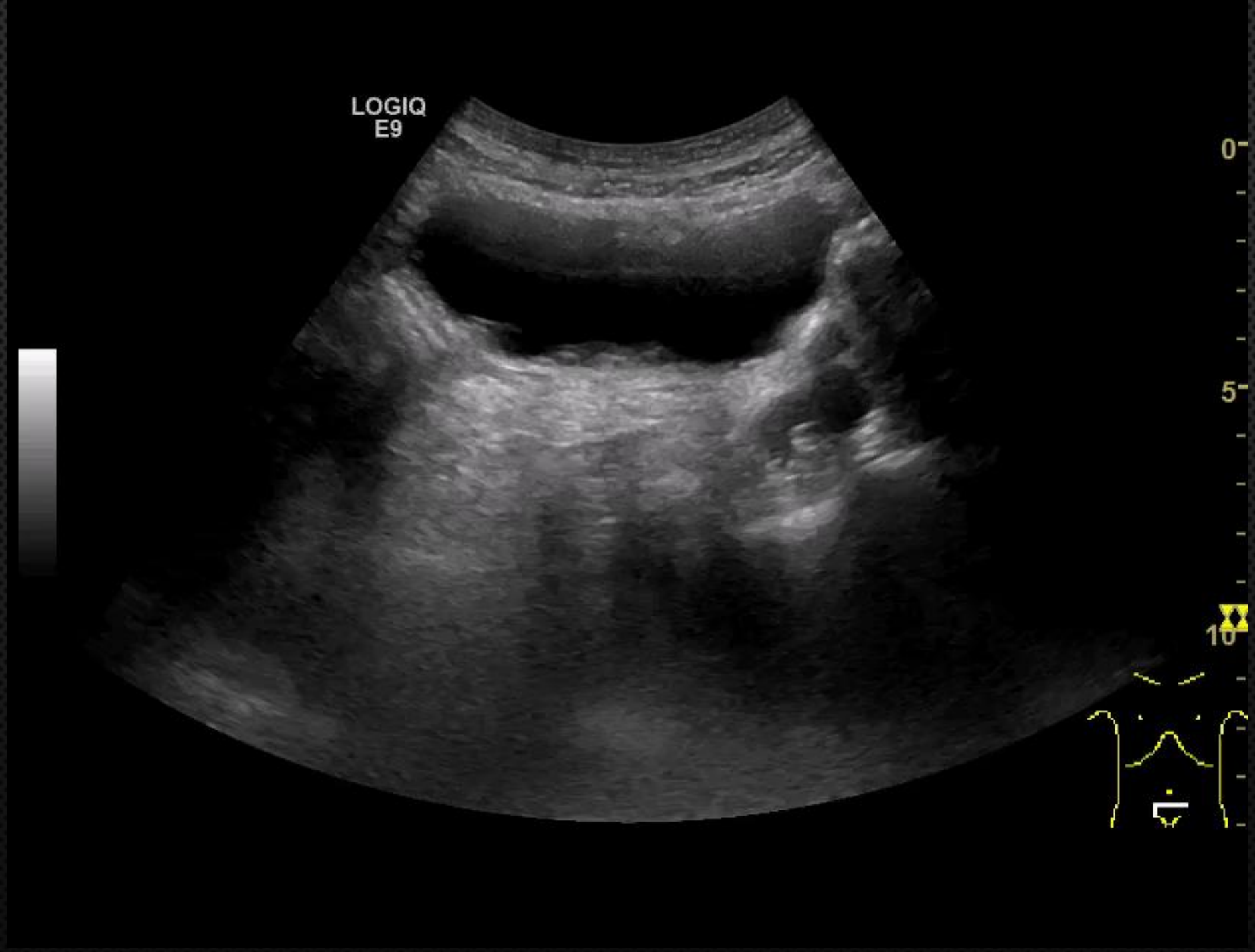
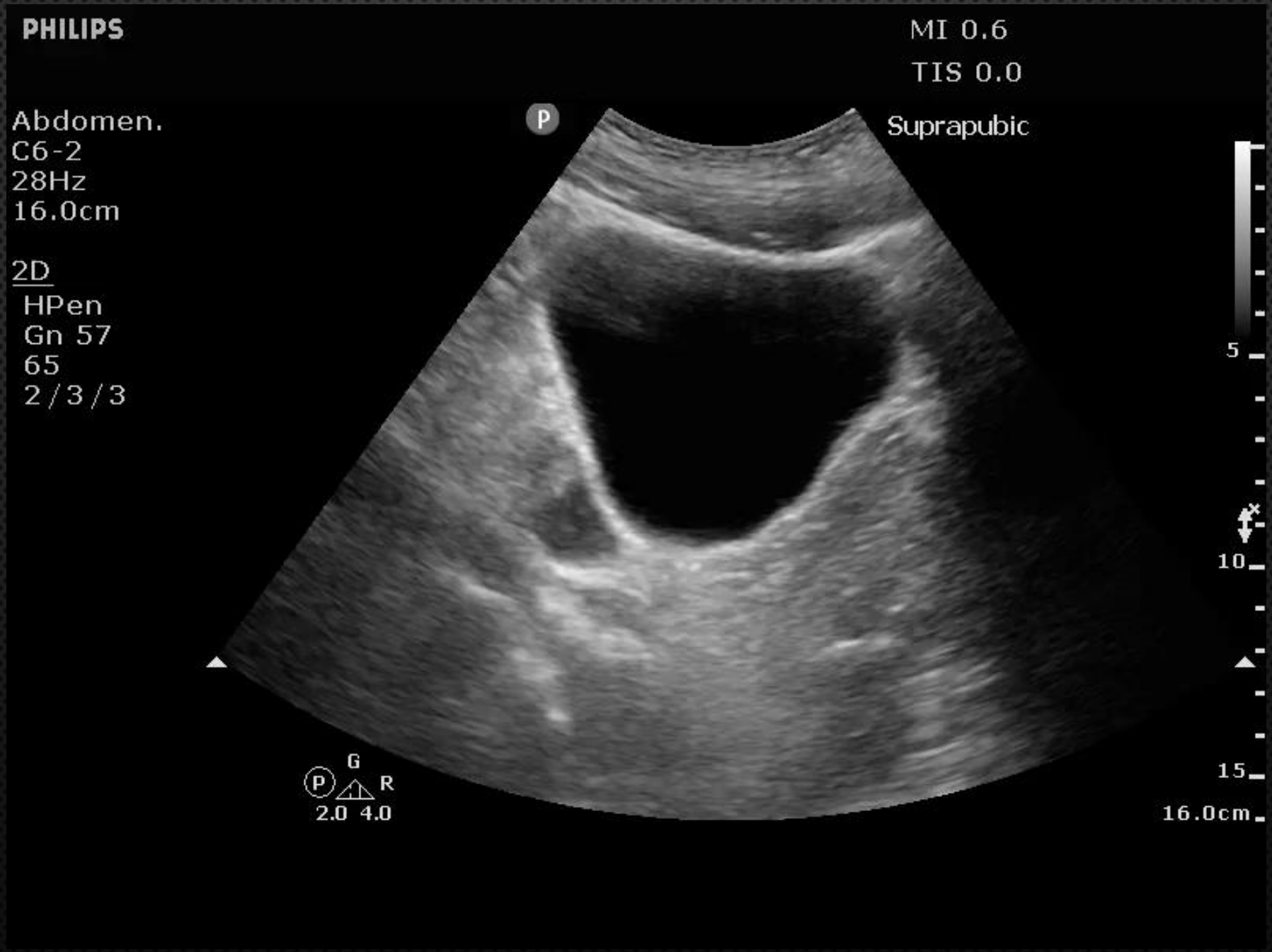
5
10


FR 19
LOGIQ
E9
CHI
Frq 4.0
Gn 56
S/A 2/1
Map F/0
D 17.0
DR 66
AO% 100
0
5
10
15


FR 19
LOGIQ
E9
CHI
Frq 4.0
Gn 54
S/A 2/1
Map F/0
D 17.0
DR 66
AO% 100
0
5
10
15


LOGIQ
E9
FR 21
CHI
Frq 4.0
Gn 59
S/A 2/1
Map F/1
D 15.0
DR 66
AO% 100
0
5
10
15


LOGIQ
E9
0
5
10

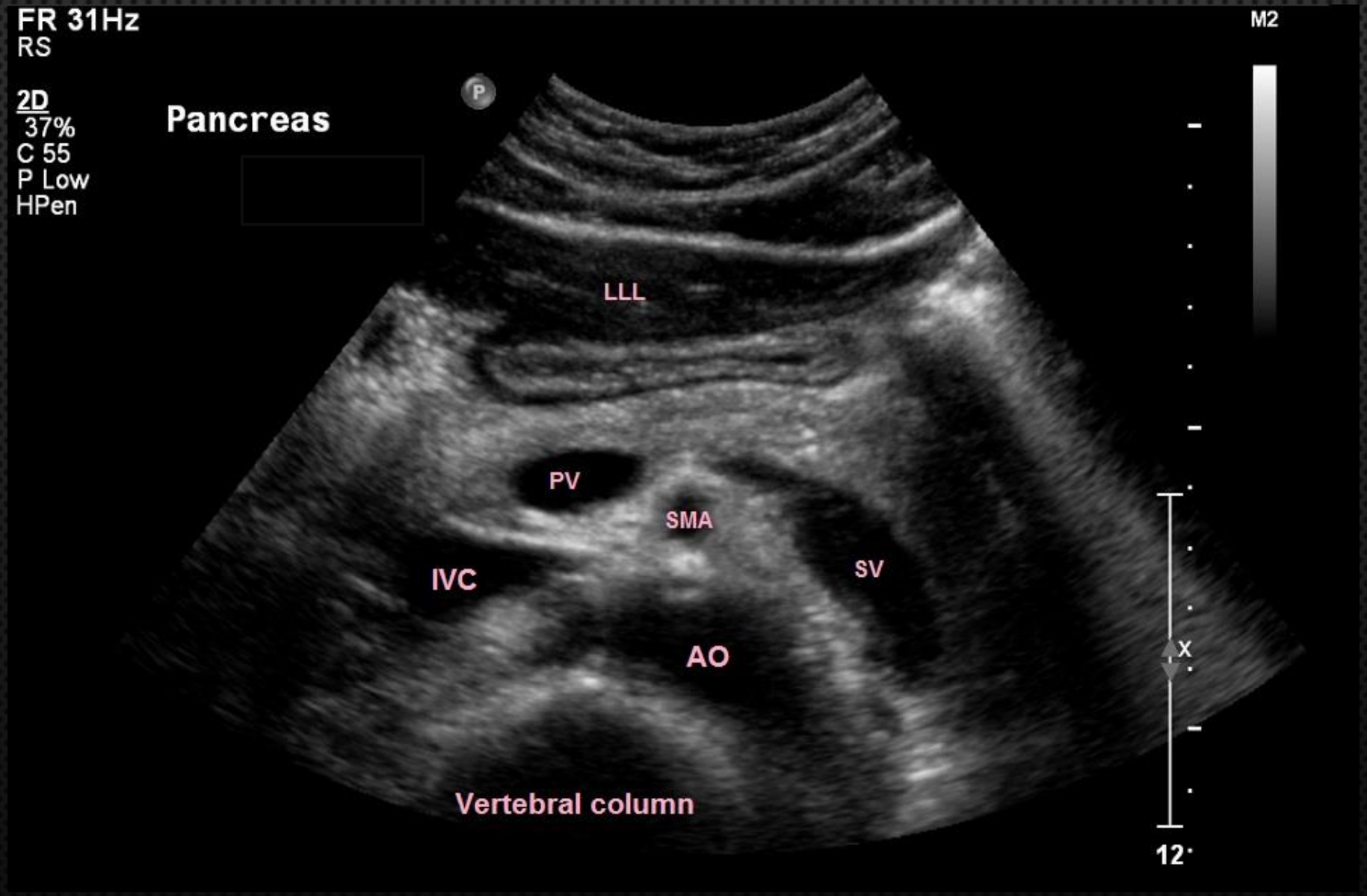

PHILIPS
MI 0.6
TIS 0.0
Abdomen.
C6-2
28Hz
16.0cm
2D
HPen
Gn 57
65
2/3/3
P
Suprapubic
5
10
15
16.0cm
G
P
R
2.0 4.0

AAA

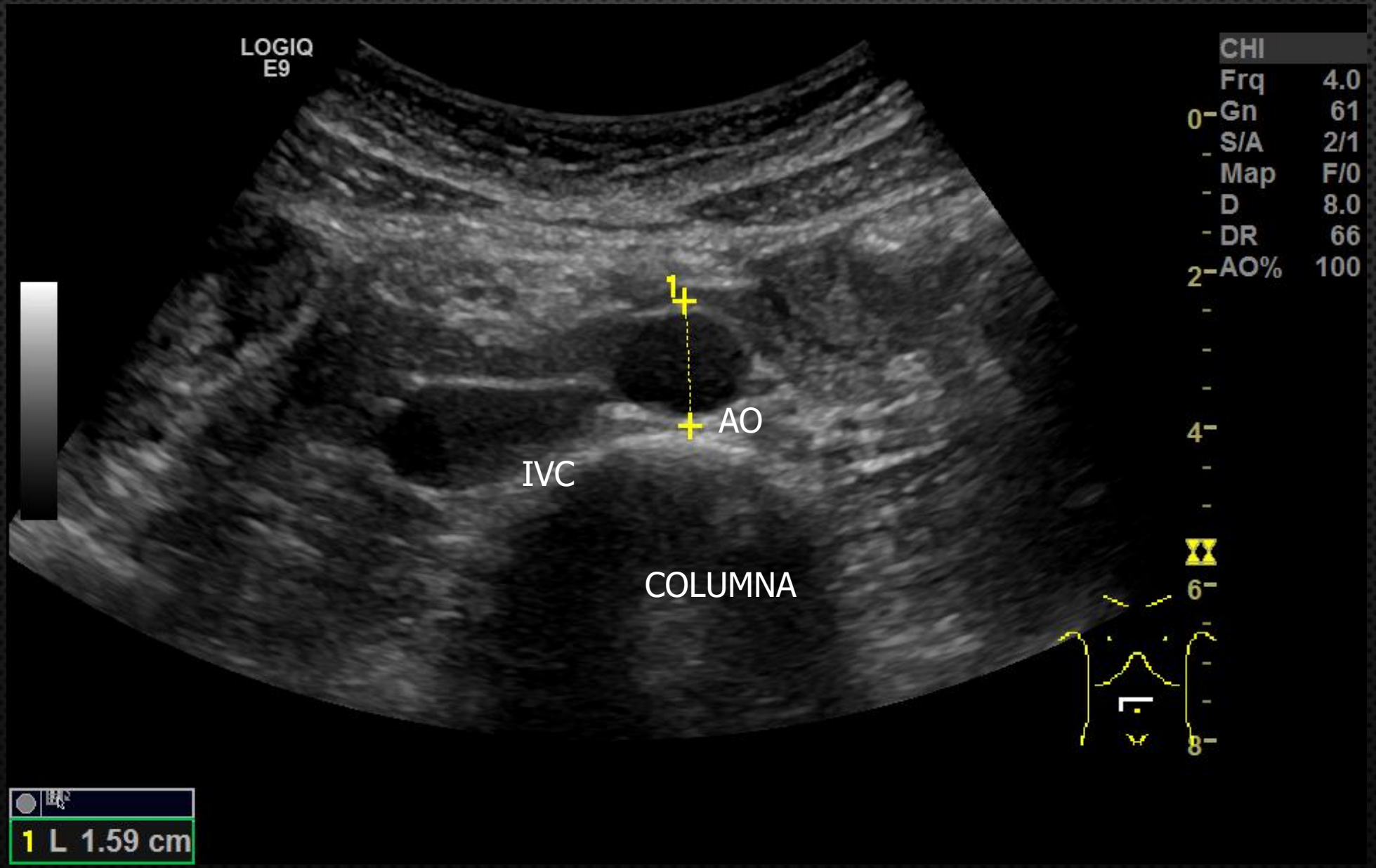
TEKNIKK

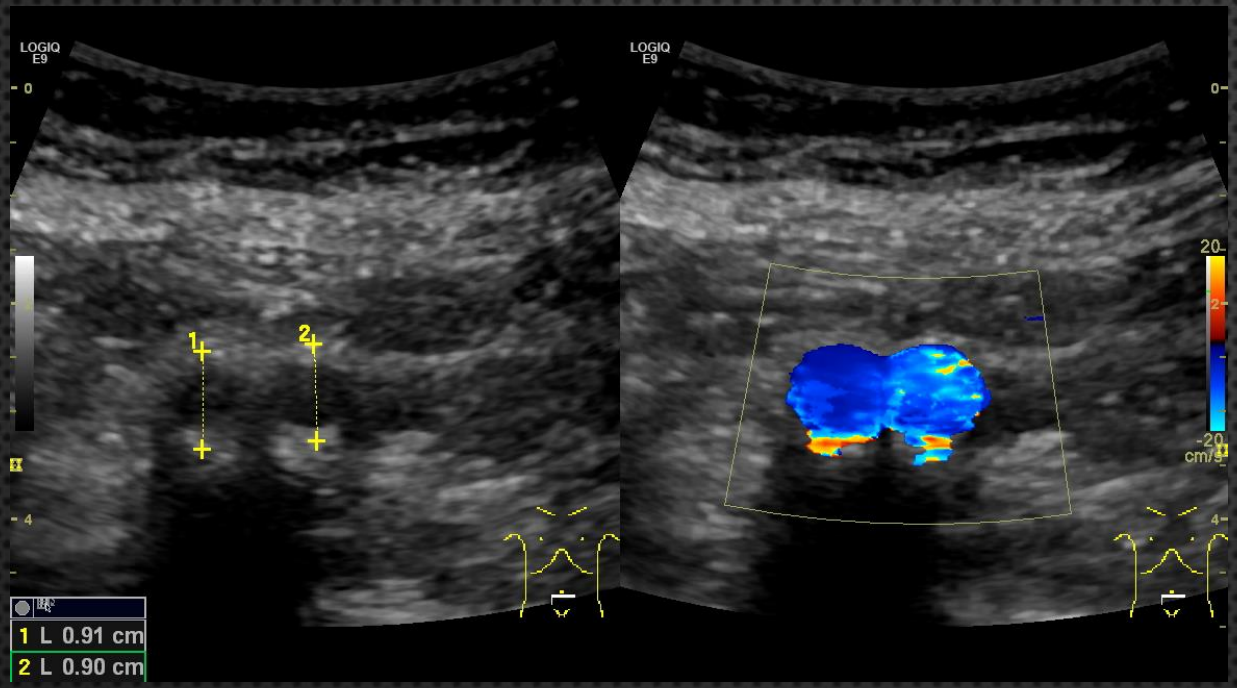
- Pasienten i ryggleie
- Abdominal probe (lav Hz)
- Abdominal / aorta pre-set
- Tverrsnitt – proben perpendikulær med huden
- «Slide» proben fra proximale del til bifurkatur

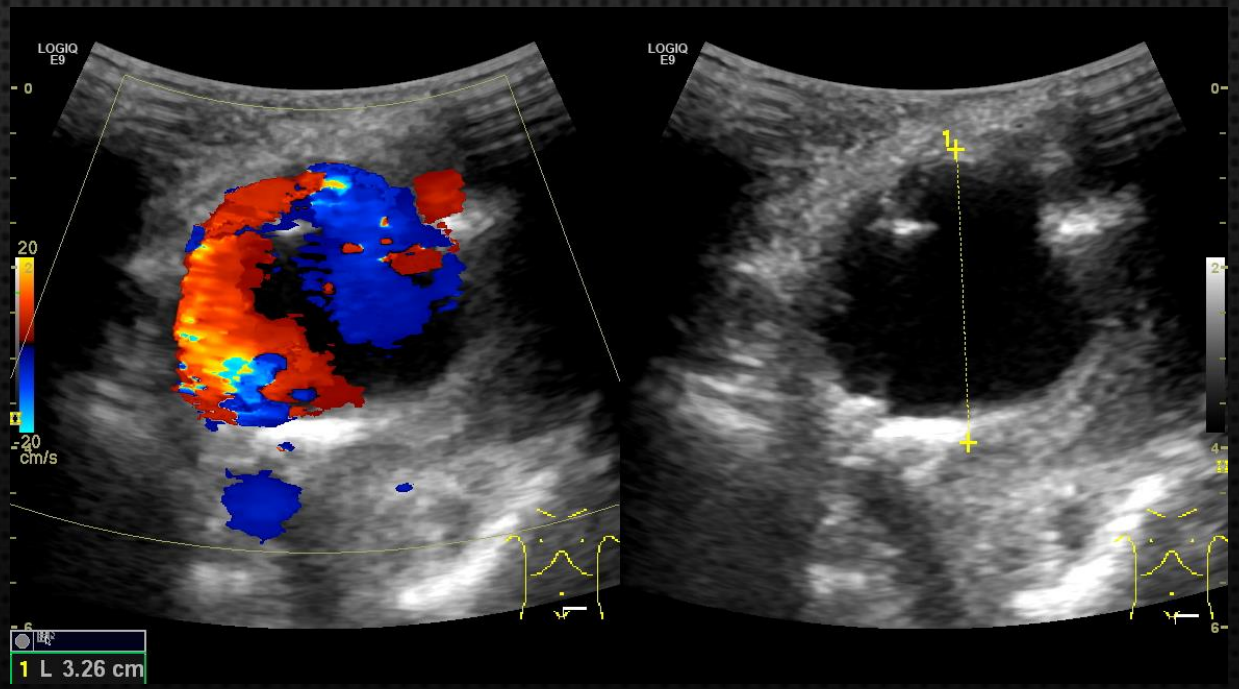
PROKSIMALE DEL



DISTALE DEL


LOGIQ
E9
CHI
Frq 4.0
Gn 61
S/A 2/1
Map F/0
D 8.0
DR 66
AO% 100
0
2
4
6
8
1
AO
IVC
COLUMNA
1 L 1.59 cm


LOGIQ
E9
1
2
1 L 0.91 cm
2 L 0.90 cm

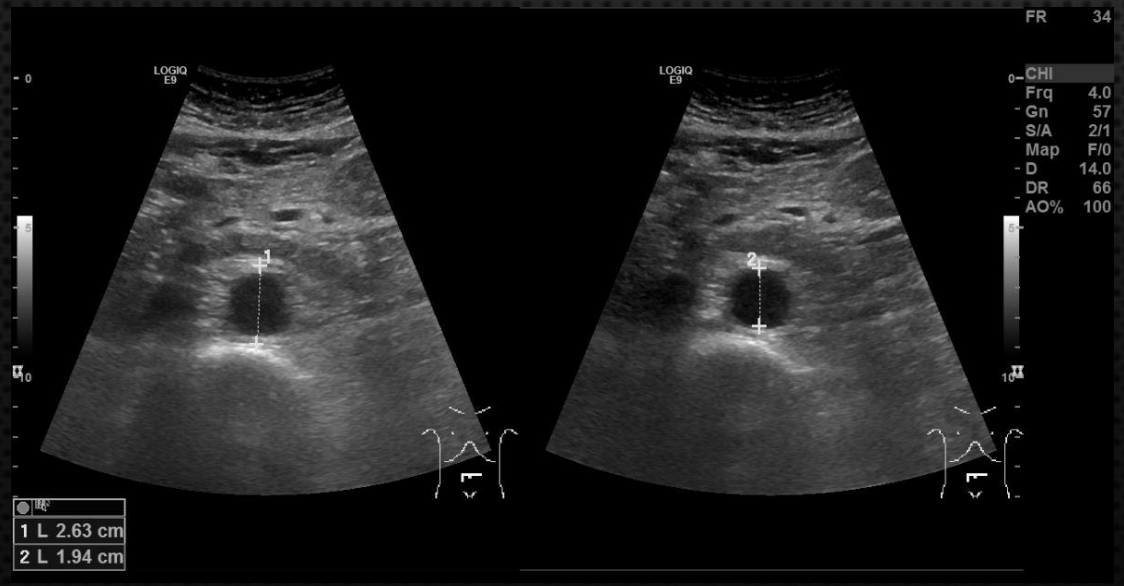

LOGIQ
E9
20
-20
cm/s
1 L 3.26 cm


LOGIQ
E9
0
5
10

HVORDAN MÅLER MAN?

- PROBEN I TVERRSNITT – PERPENDIKULÆRT MED HUDEN
- I SYSTOLE
- YTRE VEGG TIL YTRE VEGG
- ATERIOR TIL POSTERIOR

AORTA < 3 CM
ILIACA <1,5 CM



HVORDAN SER ET ABDOMINALT ANEURISME UT PÅ UL?

AP diameter

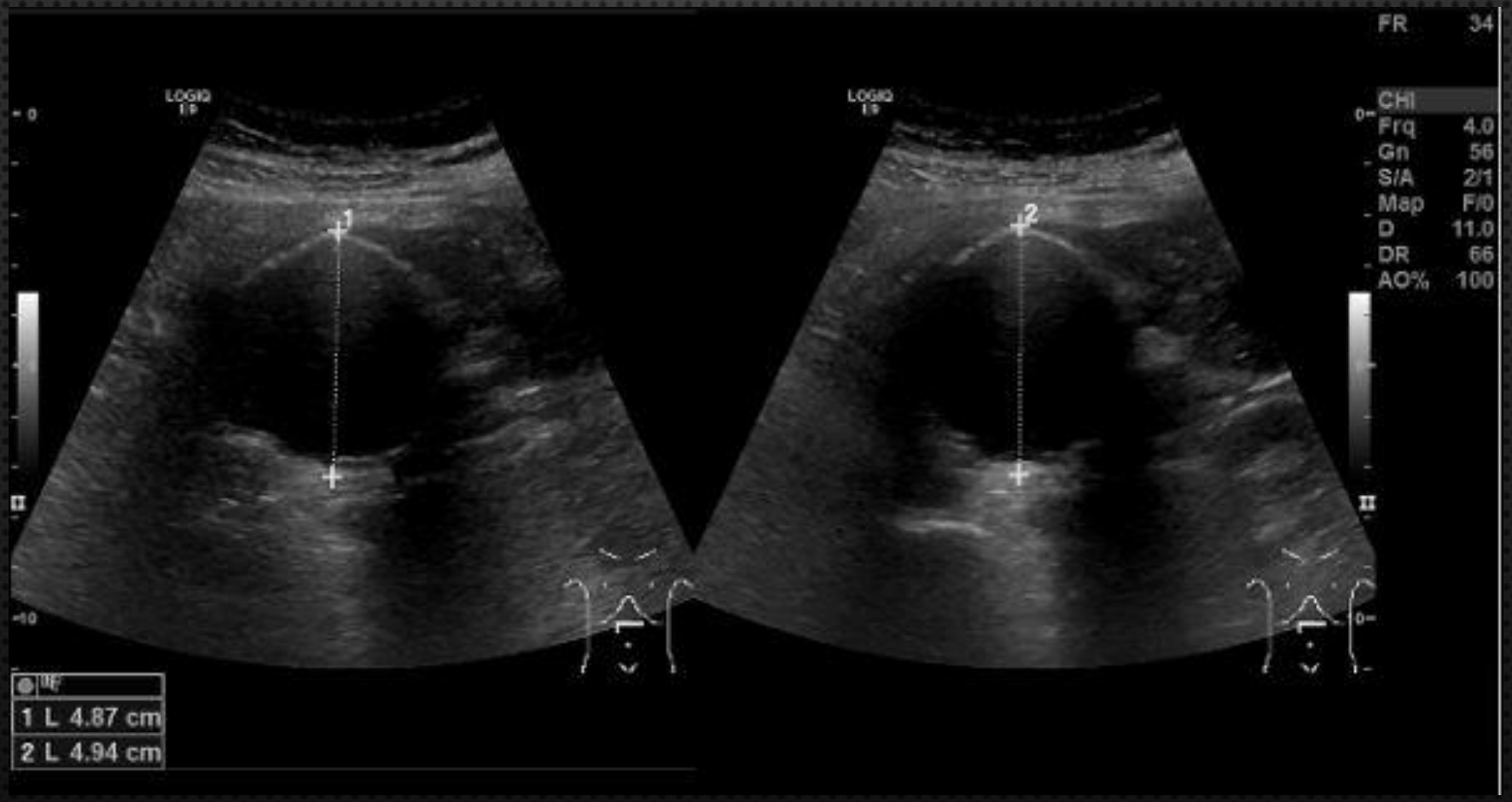
Lengde

Plakk

Infra/suprarenalt

Fusiformt/sakkulært

AIC involvert

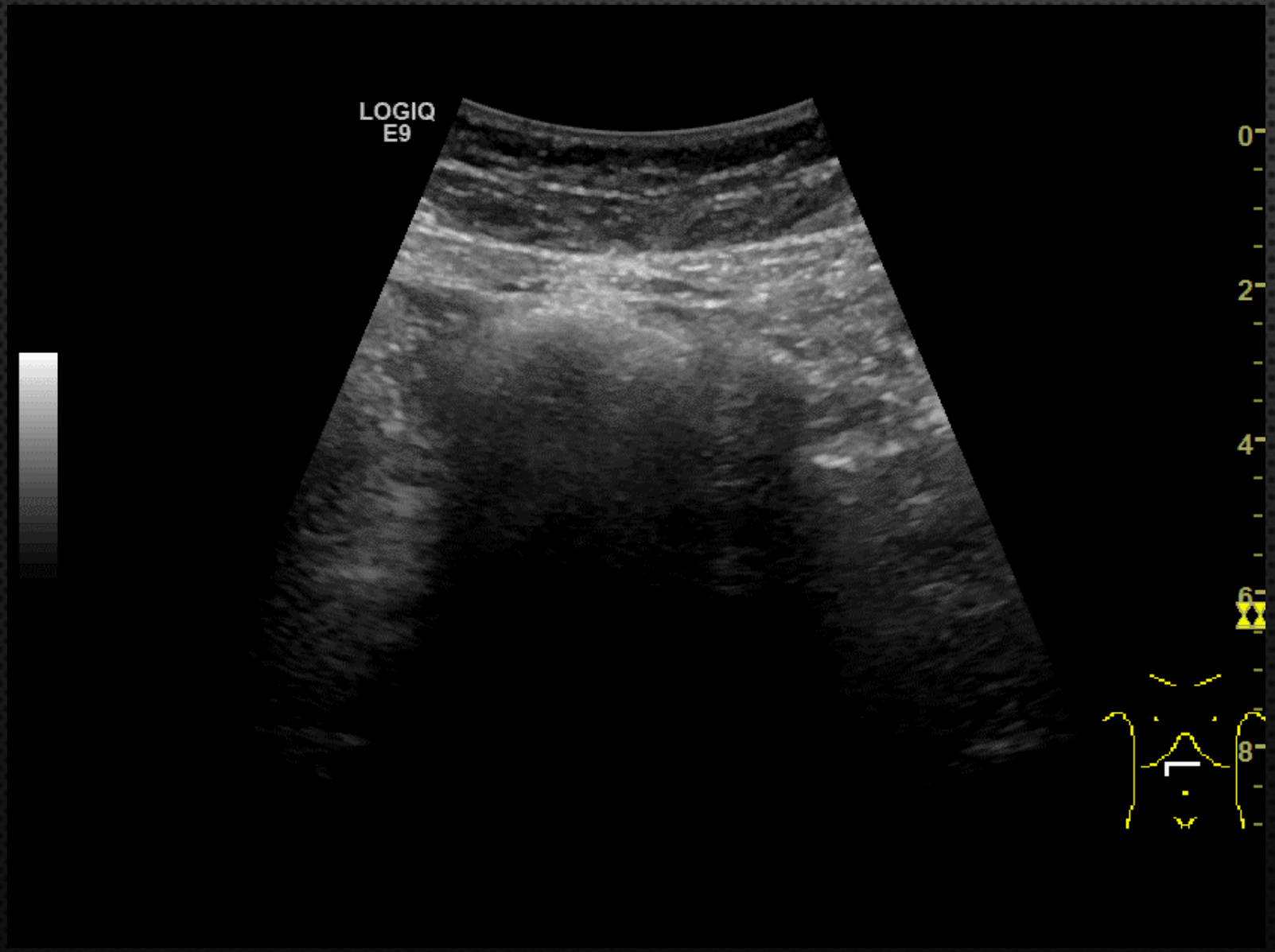

LOGIQ
LOGIQ
FR 34
CHI
Frq 4.0
Gn 56
S/A 2/1
Map F/0
D 11.0
DR 66
AO% 100
1 L 4.87 cm
2 L 4.94 cm


LOGIQ
E9
CHI
Frq 4.0
Gn 60
S/A 2/1
Map F/0
D 9.0
DR 66
AO% 100
1 L 3.00 cm

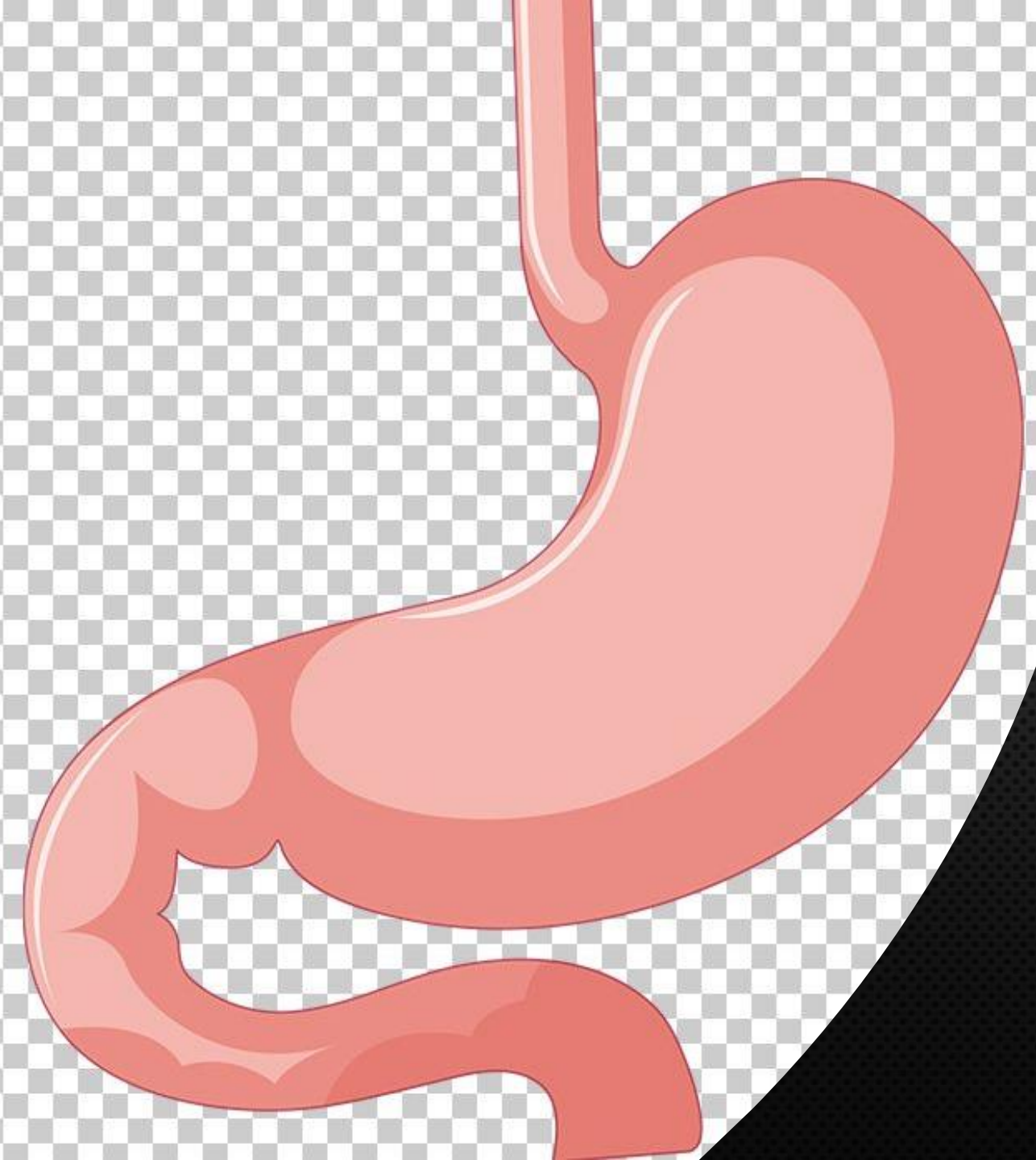

LOGIQ
E9
CHI
Frq 4.0
Gn 60
S/A 2/1
Map F/0
D 9.0
DR 66
AO% 100
1 L 4.76 cm


LOGIQ
E9
0
5
10

Utfordringer



Luft..
Luft..
Luft..



FASTESTATUS

Ultrasound assessment of gastric content and volume

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Editor's key points

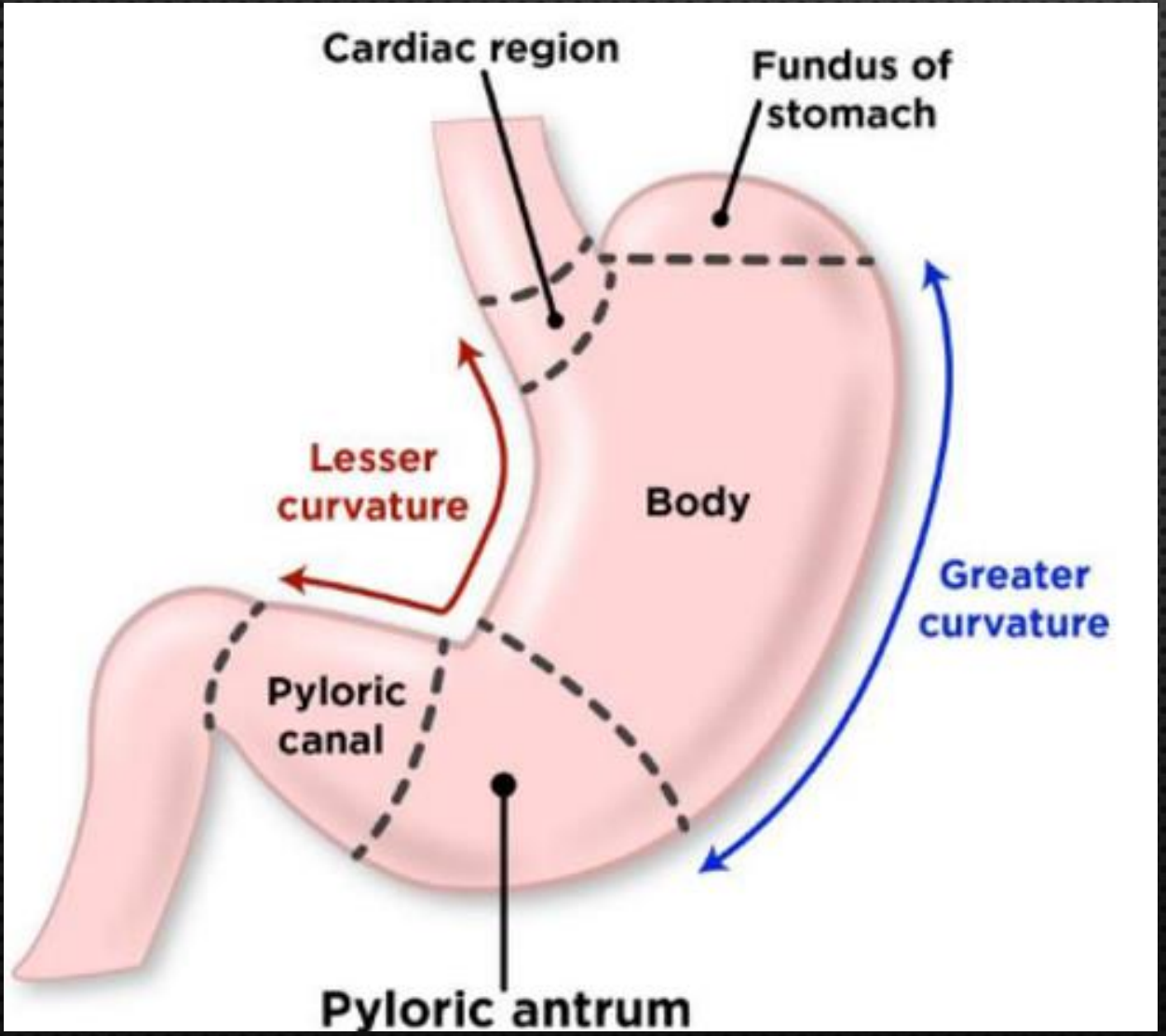
- The authors review the literature regarding the use of ultrasound to estimate gastric volume and, thus, aspiration risk.
- Suggestions for clinical usage are provided.

Pulmonary aspiration of gastric content is a serious anaesthetic complication that can lead to significant morbidity and mortality. Aspiration risk assessment is usually based on fasting times. However, fasting guidelines do not apply to urgent or emergent situations and to patients with certain co-morbidities. Gastric content and volume assessment is a new point-of-care ultrasound application that can help determine aspiration risk. This systematic review summarizes the current literature on bedside ultrasound assessment of gastric content and volume relevant to anaesthesia practice. Seventeen articles were identified using predetermined criteria. Studies were classified into those describing the sonographic characteristics of different types of gastric content (empty, clear fluid, solid), and those describing methods for quantitative assessment of gastric volume. A possible algorithm for the clinical application of this new tool is proposed, and areas that require further research are highlighted.

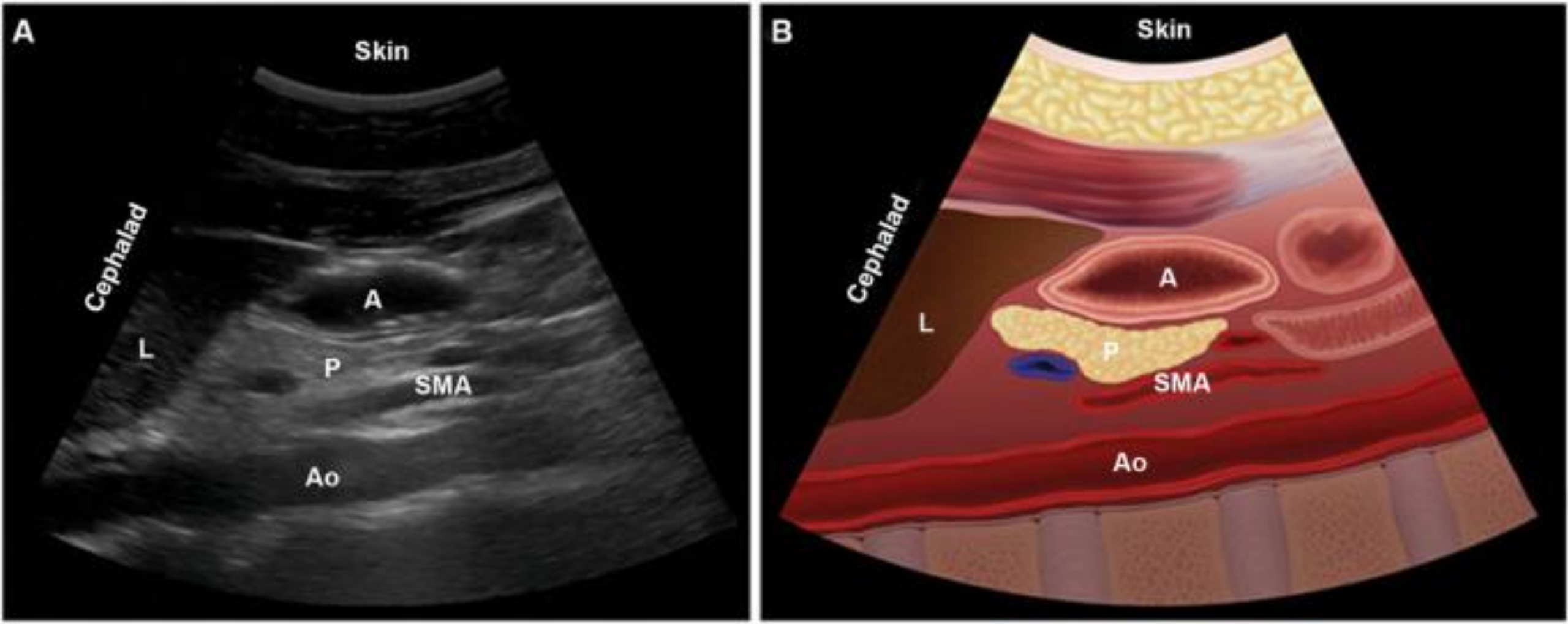
Keywords: antrum; gastric content; pulmonary aspiration; ultrasound

Perioperative aspiration of gastric contents is a rare but serious complication of anaesthesia. The overall incidence in a mixed

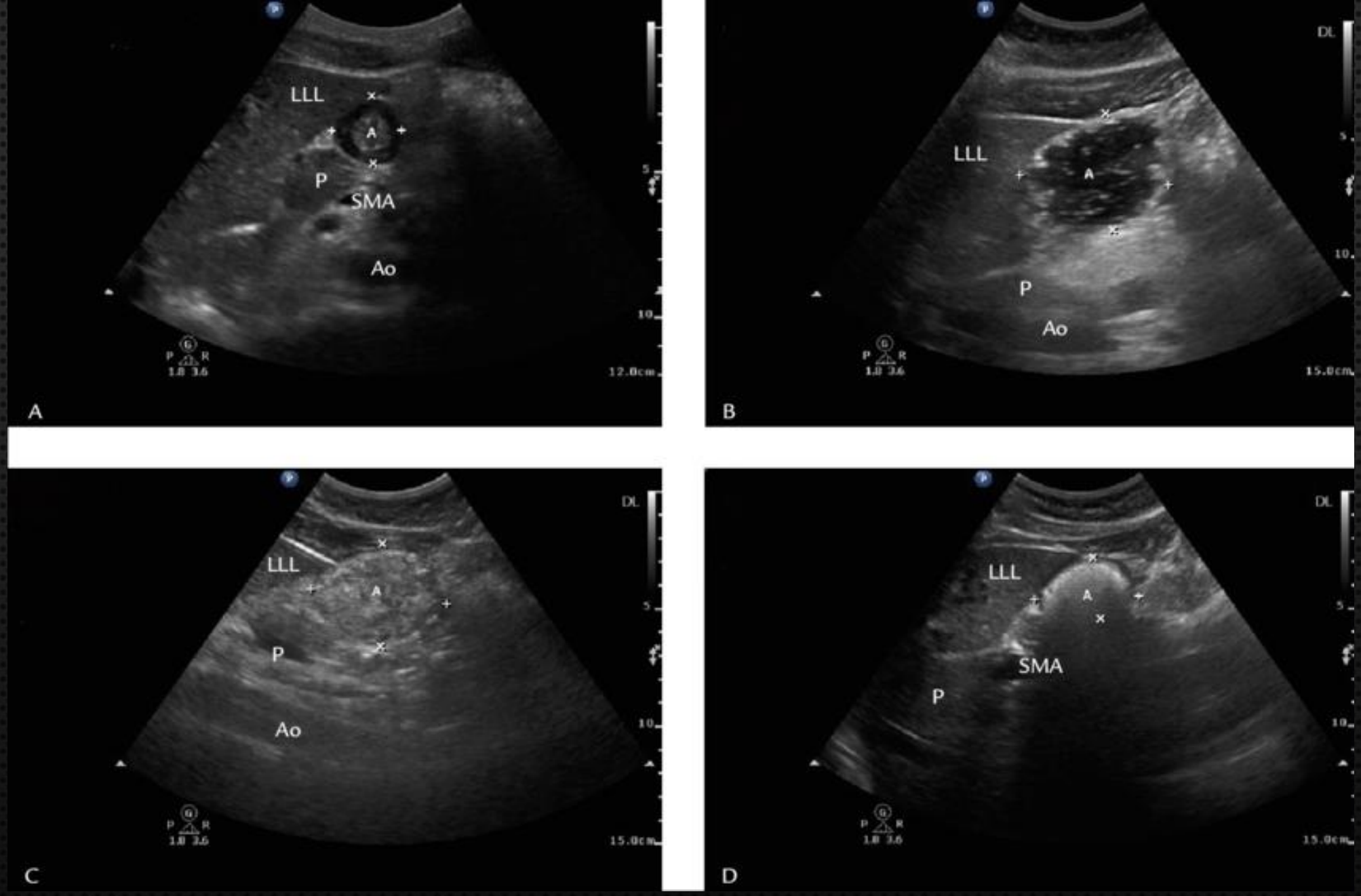
bedside ultrasound to evaluate gastric content and volume as they relate to aspiration risk assessment from the perspec-



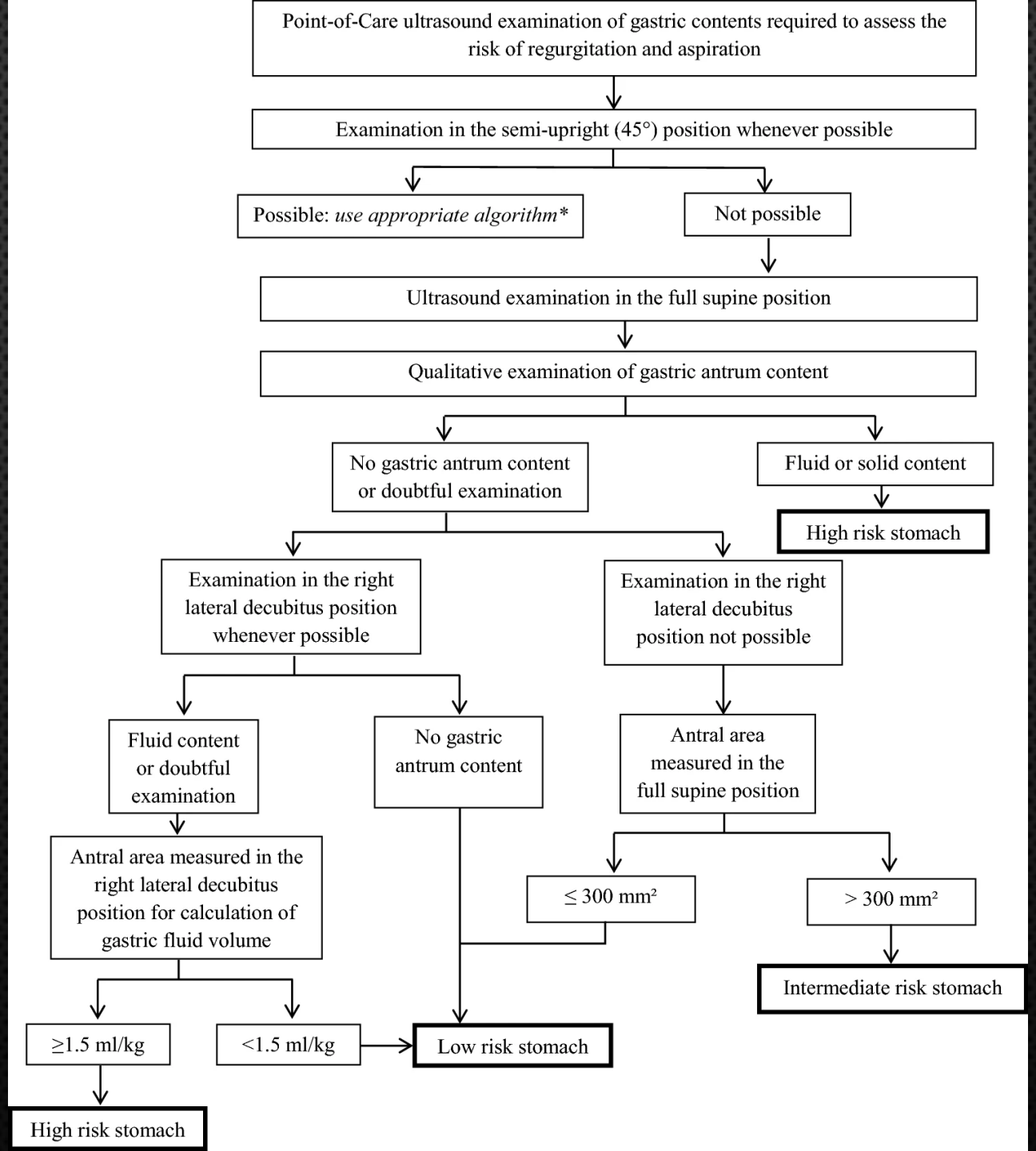
https://www.showmethepocus.com



Shorbagy MS et al. (2021). Routine point-of-care ultrasound (POCUS) assessment of gastric antral content in traumatic emergency surgical patients for prevention of aspiration pneumonitis: an observational clinical trial. BMC



Bisinotto FMB et al. (2017). Qualitative and quantitative ultrasound assessment of gastric content. Rev Assoc


Point-of-Care ultrasound examination of gastric contents required to assess the risk of regurgitation and aspiration
Examination in the semi-upright (45°) position whenever possible
Possible: use appropriate algorithm*
Not possible
Ultrasound examination in the full supine position
Qualitative examination of gastric antrum content
No gastric antrum content or doubtful examination
Fluid or solid content
High risk stomach
Examination in the right lateral decubitus position whenever possible
Examination in the right lateral decubitus position not possible
Fluid content or doubtful examination
No gastric antrum content
Antral area measured in the full supine position
Antral area measured in the right lateral decubitus position for calculation of gastric fluid volume
≤ 300 mm²
> 300 mm²
Intermediate risk stomach
≥1.5 ml/kg
<1.5 ml/kg
Low risk stomach
High risk stomach

Grade	Antral Presentation	Volume Implications	Aspiration Risk
0	Empty on BOTH supine and RLD	Minimal	Low
1	Empty on supine BUT clear visible fluid on RLD	< 1.5ml/kg. Baseline secretions seen	Low
2	Clear visible fluid on supine AND on RLD	>1.5ml/kg. MORE than baseline secretions	High


LOGIQ
FASTE 1 TIME
SUPINE
FR 28
CHI X
Frq 6.0
Gn 37
S/A A/2
Map D/0
D 14.0
Zm 0
DR 66
AO% 100
5
10


LOGIQ
FASTE 1 TIME
H DECUB
FR 30
CHI X
Frq 6.0
Gn 34
S/A A/2
Map D/0
D 13.0
Zm 0
DR 66
AO% 100
5
10


LOGIQ
FASTET 2 T
H DECUB
FR 37
Frq 6.0
Gn 43
S/A A/2
Map D/0
D 8.0
Zm 0
DR 66
AO% 100

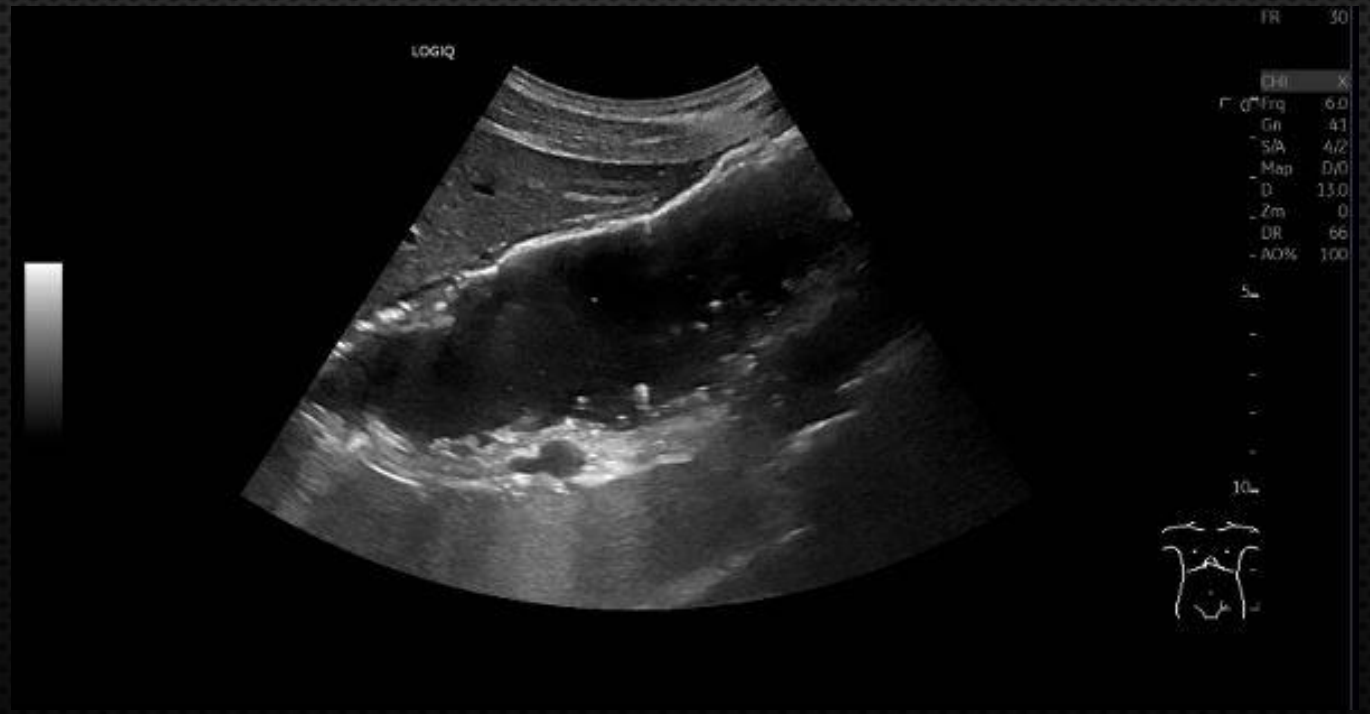

LOGIQ
FASTET 4 T
SUPINE


LOGIQ
FASTET 4 T
H DECUB


07/04/22 11:13:43 ADM C1-6 AbdDetail MI 1.4 TIs 0.4
LOGIQ
FASTET 4 T
H DECUB


LOGIQ
FASTENDE
DRUKKET VANN
SUPIBE


LOGIQ
FASTENDE
DRUKKET VANN
DECUB


LOGIQ


SPØRSMÅL?